

=> FILE HCAPLUS

FILE 'HCAPLUS' ENTERED AT 12:29:55 ON 13 MAY 2004  
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FILE COVERS 1907 - 13 May 2004 VOL 140 ISS 20  
FILE LAST UPDATED: 12 May 2004 (20040512/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> D QUE L61

L33           32 SEA FILE=REGISTRY ABB=ON (9003-55-8/BI OR 112-02-7/BI OR 12172-85-9/BI OR 12173-47-6/BI OR 12286-87-2/BI OR 12424-32-7/B I OR 1318-93-0/BI OR 1319-41-1/BI OR 1337-81-1/BI OR 14314-78-4 /BI OR 185144-29-0/BI OR 188437-43-6/BI OR 2039-80-7/BI OR 2155-94-4/BI OR 25103-58-6/BI OR 26762-93-6/BI OR 27776-21-2/BI OR 2867-47-2/BI OR 29383-23-1/BI OR 2997-92-4/BI OR 5339-11-7/ BI OR 57-09-0/BI OR 7720-78-7/BI OR 7727-21-1/BI OR 7727-54-0/B I OR 78-67-1/BI OR 79-10-7/BI OR 79-41-4/BI OR 84092-72-8/BI OR 94-36-0/BI OR 94291-22-2/BI OR 96536-37-7/BI)

L35           5 SEA FILE=REGISTRY ABB=ON 1318-93-0 OR 12172-85-9 OR 12173-47-6 OR 12286-87-2 OR 12424-32-7

L36           1 SEA FILE=REGISTRY ABB=ON 9003-55-8

L37           26 SEA FILE=REGISTRY ABB=ON L33 NOT (L35 OR L36)

L38           5 SEA FILE=REGISTRY ABB=ON L37 AND AMINIUM

L39           7 SEA FILE=REGISTRY ABB=ON L37 AND AMMONIUM

L40           14 SEA FILE=REGISTRY ABB=ON L37 AND 2/NC

L41           13 SEA FILE=REGISTRY ABB=ON L40 NOT SAPONITE

L42           13 SEA FILE=REGISTRY ABB=ON L38 OR L39 OR L41

L43           187947 SEA FILE=HCAPLUS ABB=ON L35 OR CLAY# OR MONTMORILLONITE OR BEIDELLITE OR HECTORITE OR VOLKONSKOITE OR SAUCONITE OR SAPIOLITE OR BENTONITE

L44           1 SEA FILE=HCAPLUS ABB=ON NONTRITE OR SOBOCKITE OR STERENSITE OR SINFORDITE

L45           7733 SEA FILE=HCAPLUS ABB=ON (L43 OR L44) AND (SBR OR STYRENE(W) BUTADIENE OR L36 OR RUBBER# OR ELASTOMER? OR LATEX)

L46           382 SEA FILE=HCAPLUS ABB=ON L45 AND NANO?

L47           587060 SEA FILE=HCAPLUS ABB=ON L42 OR CATION? OR QUAT?

L48           96 SEA FILE=HCAPLUS ABB=ON L46 AND L47

L49           14 SEA FILE=HCAPLUS ABB=ON L48 AND (NANOPARTICLE? OR PLATELET? OR PARTICLE?)

L51           3 SEA FILE=HCAPLUS ABB=ON L49 AND RUBBER?/SC, SX

L52           88 SEA FILE=HCAPLUS ABB=ON L48 AND (NANOPARTICLE? OR NANOCOMPOSIT?)

L53        36 SEA FILE=HCAPLUS ABB=ON L52 AND RUBBER?/SC, SX  
L55        9 SEA FILE=HCAPLUS ABB=ON L53 AND (AQ OR AQUEOUS OR H2O OR  
            WATER?)  
L56        5 SEA FILE=HCAPLUS ABB=ON L53 AND LATEX  
L58        64 SEA FILE=HCAPLUS ABB=ON L48 AND POF/RL  
L59        29 SEA FILE=HCAPLUS ABB=ON L53 AND L58  
L60        31 SEA FILE=HCAPLUS ABB=ON L51 OR L55 OR L56 OR L59  
L61        36 SEA FILE=HCAPLUS ABB=ON L53 OR L60

=> FILE WPIX  
FILE 'WPIX' ENTERED AT 12:30:06 ON 13 MAY 2004  
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FILE LAST UPDATED:        11 MAY 2004        <20040511/UP>  
MOST RECENT DERWENT UPDATE:        200430        <200430/DW>  
DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

>>> FOR A COPY OF THE DERWENT WORLD PATENTS INDEX STN USER GUIDE,  
      PLEASE VISIT:  
[<<<](http://www.stn-international.de/training_center/patents/stn_guide.pdf)

>>> FOR DETAILS OF THE PATENTS COVERED IN CURRENT UPDATES, SEE  
<http://thomsonderwent.com/coverage/latestupdates/> <<<

>>> FOR INFORMATION ON ALL DERWENT WORLD PATENTS INDEX USER  
GUIDES, PLEASE VISIT:  
<http://thomsonderwent.com/support/userguides/> <<<

>>> NEW! FAST-ALERTING ACCESS TO NEWLY-PUBLISHED PATENT  
DOCUMENTATION NOW AVAILABLE IN DERWENT WORLD PATENTS INDEX  
FIRST VIEW - FILE WPIFV. FREE CONNECT HOUR UNTIL 1 MAY 2004.  
FOR FURTHER DETAILS: [<<<](http://www.thomsonderwent.com/dwpifv)

>>> NEW! IMPROVE YOUR LITIGATION CHECKING AND INFRINGEMENT  
MONITORING WITH LITALERT. FIRST ACCESS TO RECORDS OF IP  
LAWSUITS FILED IN THE 94 US DISTRICT COURTS SINCE 1973.  
FOR FURTHER DETAILS:  
[<<<](http://www.thomsonscientific.com/litalert)

>>> THE DISPLAY LAYOUT HAS BEEN CHANGED TO ACCOMODATE THE  
NEW FORMAT GERMAN PATENT APPLICATION AND PUBLICATION  
NUMBERS. SEE ALSO:  
[<<<](http://www.stn-international.de/archive/stnews/news0104.pdf)

>>> SINCE THE FILE HAD NOT BEEN UPDATED BETWEEN APRIL 12-16  
THERE WAS NO WEEKLY SDI RUN <<<

=> D QUE L67

L33        32 SEA FILE=REGISTRY ABB=ON (9003-55-8/BI OR 112-02-7/BI OR  
            12172-85-9/BI OR 12173-47-6/BI OR 12286-87-2/BI OR 12424-32-7/B  
            I OR 1318-93-0/BI OR 1319-41-1/BI OR 1337-81-1/BI OR 14314-78-4  
            /BI OR 185144-29-0/BI OR 188437-43-6/BI OR 2039-80-7/BI OR  
            2155-94-4/BI OR 25103-58-6/BI OR 26762-93-6/BI OR 27776-21-2/BI  
            OR 2867-47-2/BI OR 29383-23-1/BI OR 2997-92-4/BI OR 5339-11-7/  
            BI OR 57-09-0/BI OR 7720-78-7/BI OR 7727-21-1/BI OR 7727-54-0/B  
            I OR 78-67-1/BI OR 79-10-7/BI OR 79-41-4/BI OR 84092-72-8/BI  
            OR 94-36-0/BI OR 94291-22-2/BI OR 96536-37-7/BI)

L35           5 SEA FILE=REGISTRY ABB=ON 1318-93-0 OR 12172-85-9 OR 12173-47-6  
               OR 12286-87-2 OR 12424-32-7  
L36           1 SEA FILE=REGISTRY ABB=ON 9003-55-8  
L37           26 SEA FILE=REGISTRY ABB=ON L33 NOT (L35 OR L36)  
L38           5 SEA FILE=REGISTRY ABB=ON L37 AND AMINIUM  
L39           7 SEA FILE=REGISTRY ABB=ON L37 AND AMMONIUM  
L40           14 SEA FILE=REGISTRY ABB=ON L37 AND 2/NC  
L41           13 SEA FILE=REGISTRY ABB=ON L40 NOT SAPONITE  
L42           13 SEA FILE=REGISTRY ABB=ON L38 OR L39 OR L41  
L43           187947 SEA FILE=HCAPLUS ABB=ON L35 OR CLAY# OR MONTMORILLONITE OR  
               BEIDELLITE OR HECTORITE OR VOLKONSKOITE OR SAUCONITE OR  
               SAPIOLITE OR BENTONITE  
L44           1 SEA FILE=HCAPLUS ABB=ON NONTRITE OR SOBOCKITE OR STERENSITE  
               OR SINFORDITE  
L45           7733 SEA FILE=HCAPLUS ABB=ON (L43 OR L44) AND (SBR OR STYRENE(W) BUT  
               ADIENE OR L36 OR RUBBER# OR ELASTOMER? OR LATEX)  
L46           382 SEA FILE=HCAPLUS ABB=ON L45 AND NANO?  
L47           587060 SEA FILE=HCAPLUS ABB=ON L42 OR CATION? OR QUAT?  
L63           32 SEA FILE=WPIX ABB=ON L46 AND L47  
L64           30 SEA FILE=WPIX ABB=ON L63 AND C08?/IC  
L65           13 SEA FILE=WPIX ABB=ON L64 AND (PARTICLE? OR NANOPARTICLE? OR  
               AQ OR AQUEOUS OR H2O OR WATER? OR LATEX)  
L66           5 SEA FILE=WPIX ABB=ON L63 AND (TIRE# OR TYRE#)  
L67           15 SEA FILE=WPIX ABB=ON L65 OR L66

=> FILE JICST  
FILE 'JICST-EPLUS' ENTERED AT 12:30:21 ON 13 MAY 2004  
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FILE COVERS 1985 TO 10 MAY 2004 (20040510/ED)

THE JICST-EPLUS FILE HAS BEEN RELOADED TO REFLECT THE 1999 CONTROLLED  
TERM (/CT) THESAURUS RELOAD.

=> D QUE L73  
L33           32 SEA FILE=REGISTRY ABB=ON (9003-55-8/BI OR 112-02-7/BI OR  
               12172-85-9/BI OR 12173-47-6/BI OR 12286-87-2/BI OR 12424-32-7/B  
               I OR 1318-93-0/BI OR 1319-41-1/BI OR 1337-81-1/BI OR 14314-78-4  
               /BI OR 185144-29-0/BI OR 188437-43-6/BI OR 2039-80-7/BI OR  
               2155-94-4/BI OR 25103-58-6/BI OR 26762-93-6/BI OR 27776-21-2/BI  
               OR 2867-47-2/BI OR 29383-23-1/BI OR 2997-92-4/BI OR 5339-11-7/  
               BI OR 57-09-0/BI OR 7720-78-7/BI OR 7727-21-1/BI OR 7727-54-0/B  
               I OR 78-67-1/BI OR 79-10-7/BI OR 79-41-4/BI OR 84092-72-8/BI  
               OR 94-36-0/BI OR 94291-22-2/BI OR 96536-37-7/BI)  
L35           5 SEA FILE=REGISTRY ABB=ON 1318-93-0 OR 12172-85-9 OR 12173-47-6  
               OR 12286-87-2 OR 12424-32-7  
L36           1 SEA FILE=REGISTRY ABB=ON 9003-55-8  
L37           26 SEA FILE=REGISTRY ABB=ON L33 NOT (L35 OR L36)  
L38           5 SEA FILE=REGISTRY ABB=ON L37 AND AMINIUM  
L39           7 SEA FILE=REGISTRY ABB=ON L37 AND AMMONIUM  
L40           14 SEA FILE=REGISTRY ABB=ON L37 AND 2/NC  
L41           13 SEA FILE=REGISTRY ABB=ON L40 NOT SAPONITE  
L42           13 SEA FILE=REGISTRY ABB=ON L38 OR L39 OR L41  
L43           187947 SEA FILE=HCAPLUS ABB=ON L35 OR CLAY# OR MONTMORILLONITE OR  
               BEIDELLITE OR HECTORITE OR VOLKONSKOITE OR SAUCONITE OR  
               SAPIOLITE OR BENTONITE  
L44           1 SEA FILE=HCAPLUS ABB=ON NONTRITE OR SOBOCKITE OR STERENSITE

OR SINFORDITE

L45 7733 SEA FILE=HCAPLUS ABB=ON (L43 OR L44) AND (SBR OR STYRENE(W) BUT  
ADIENE OR L36 OR RUBBER# OR ELASTOMER? OR LATEX)  
L46 382 SEA FILE=HCAPLUS ABB=ON L45 AND NANO?  
L47 587060 SEA FILE=HCAPLUS ABB=ON L42 OR CATION? OR QUAT?  
L73 1 SEA FILE=JICST-EPLUS ABB=ON L46 AND L47

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=> FILE RAPRA

FILE 'RAPRA' ENTERED AT 12:30:33 ON 13 MAY 2004  
COPYRIGHT (C) 2004 RAPRA Technology Ltd.

FILE LAST UPDATED: 26 APR 2004 <20040426/UP>  
FILE COVERS 1972 TO DATE

>>> Simultaneous left and right truncation is available in the  
basic index (/BI), and in the controlled term (/CT),  
geographical term (/GT), and non-polymer term (/NPT) fields. <<<

>>> New search field /AB is available <<<

>>> The RAPRA Classification Code is available as a PDF file  
>>> and may be downloaded free-of-charge from:  
>>> [http://www.stn-international.de/stndatabases/details/rapra\\_classcodes.pdf](http://www.stn-international.de/stndatabases/details/rapra_classcodes.pdf)

>>> New monthly SDI Alert availability --> see NEWS <<<

=> D QUE L71

L33 32 SEA FILE=REGISTRY ABB=ON (9003-55-8/BI OR 112-02-7/BI OR  
12172-85-9/BI OR 12173-47-6/BI OR 12286-87-2/BI OR 12424-32-7/B  
I OR 1318-93-0/BI OR 1319-41-1/BI OR 1337-81-1/BI OR 14314-78-4  
/BI OR 185144-29-0/BI OR 188437-43-6/BI OR 2039-80-7/BI OR  
2155-94-4/BI OR 25103-58-6/BI OR 26762-93-6/BI OR 27776-21-2/BI  
OR 2867-47-2/BI OR 29383-23-1/BI OR 2997-92-4/BI OR 5339-11-7/  
BI OR 57-09-0/BI OR 7720-78-7/BI OR 7727-21-1/BI OR 7727-54-0/B  
I OR 78-67-1/BI OR 79-10-7/BI OR 79-41-4/BI OR 84092-72-8/BI  
OR 94-36-0/BI OR 94291-22-2/BI OR 96536-37-7/BI)  
L35 5 SEA FILE=REGISTRY ABB=ON 1318-93-0 OR 12172-85-9 OR 12173-47-6  
OR 12286-87-2 OR 12424-32-7  
L36 1 SEA FILE=REGISTRY ABB=ON 9003-55-8  
L37 26 SEA FILE=REGISTRY ABB=ON L33 NOT (L35 OR L36)  
L38 5 SEA FILE=REGISTRY ABB=ON L37 AND AMINIUM  
L39 7 SEA FILE=REGISTRY ABB=ON L37 AND AMMONIUM  
L40 14 SEA FILE=REGISTRY ABB=ON L37 AND 2/NC  
L41 13 SEA FILE=REGISTRY ABB=ON L40 NOT SAPONITE  
L42 13 SEA FILE=REGISTRY ABB=ON L38 OR L39 OR L41  
L43 187947 SEA FILE=HCAPLUS ABB=ON L35 OR CLAY# OR MONTMORILLONITE OR  
BEIDELLITE OR HECTORITE OR VOLKONSKOITE OR SAUCONITE OR  
SAPIOLITE OR BENTONITE  
L44 1 SEA FILE=HCAPLUS ABB=ON NONTRITE OR SOBOCKITE OR STERENSITE  
OR SINFORDITE  
L45 7733 SEA FILE=HCAPLUS ABB=ON (L43 OR L44) AND (SBR OR STYRENE(W) BUT  
ADIENE OR L36 OR RUBBER# OR ELASTOMER? OR LATEX)  
L46 382 SEA FILE=HCAPLUS ABB=ON L45 AND NANO?  
L47 587060 SEA FILE=HCAPLUS ABB=ON L42 OR CATION? OR QUAT?  
L68 14 SEA FILE=RAPRA ABB=ON L46 AND L47  
L69 1 SEA FILE=RAPRA ABB=ON L68 AND (TIRE# OR TYRE#)  
L70 4 SEA FILE=RAPRA ABB=ON L68 AND (PARTICLE? OR NANOPARTICLE? OR

L71  
AQ OR AQUEOUS OR H<sub>2</sub>O OR WATER? OR LATEX)  
5 SEA FILE=RAPRA ABB=ON L69 OR L70

=> FILE JAPIO  
FILE 'JAPIO' ENTERED AT 12:30:45 ON 13 MAY 2004  
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FILE LAST UPDATED: 8 APR 2004 <20040408/UP>  
FILE COVERS APR 1973 TO DECEMBER 05, 2003

<<< GRAPHIC IMAGES AVAILABLE >>>

=> D QUE L74

L33 32 SEA FILE=REGISTRY ABB=ON (9003-55-8/BI OR 112-02-7/BI OR  
12172-85-9/BI OR 12173-47-6/BI OR 12286-87-2/BI OR 12424-32-7/B  
I OR 1318-93-0/BI OR 1319-41-1/BI OR 1337-81-1/BI OR 14314-78-4  
/BI OR 185144-29-0/BI OR 188437-43-6/BI OR 2039-80-7/BI OR  
2155-94-4/BI OR 25103-58-6/BI OR 26762-93-6/BI OR 27776-21-2/BI  
OR 2867-47-2/BI OR 29383-23-1/BI OR 2997-92-4/BI OR 5339-11-7/  
BI OR 57-09-0/BI OR 7720-78-7/BI OR 7727-21-1/BI OR 7727-54-0/B  
I OR 78-67-1/BI OR 79-10-7/BI OR 79-41-4/BI OR 84092-72-8/BI  
OR 94-36-0/BI OR 94291-22-2/BI OR 96536-37-7/BI)  
L35 5 SEA FILE=REGISTRY ABB=ON 1318-93-0 OR 12172-85-9 OR 12173-47-6  
OR 12286-87-2 OR 12424-32-7  
L36 1 SEA FILE=REGISTRY ABB=ON 9003-55-8  
L37 26 SEA FILE=REGISTRY ABB=ON L33 NOT (L35 OR L36)  
L38 5 SEA FILE=REGISTRY ABB=ON L37 AND AMINIUM  
L39 7 SEA FILE=REGISTRY ABB=ON L37 AND AMMONIUM  
L40 14 SEA FILE=REGISTRY ABB=ON L37 AND 2/NC  
L41 13 SEA FILE=REGISTRY ABB=ON L40 NOT SAPONITE  
L42 13 SEA FILE=REGISTRY ABB=ON L38 OR L39 OR L41  
L43 187947 SEA FILE=HCAPLUS ABB=ON L35 OR CLAY# OR MONTMORILLONITE OR  
BEIDELLITE OR HECTORITE OR VOLKONSKOITE OR SAUCONITE OR  
SAPIOLITE OR BENTONITE  
L44 1 SEA FILE=HCAPLUS ABB=ON NONTRITE OR SOBOCKITE OR STERENSITE  
OR SINFORDITE  
L45 7733 SEA FILE=HCAPLUS ABB=ON (L43 OR L44) AND (SBR OR STYRENE(W) BUT  
ADIENE OR L36 OR RUBBER# OR ELASTOMER? OR LATEX)  
L46 382 SEA FILE=HCAPLUS ABB=ON L45 AND NANO?  
L47 587060 SEA FILE=HCAPLUS ABB=ON L42 OR CATION? OR QUAT?  
L63 32 SEA FILE=WPIX ABB=ON L46 AND L47  
L74 2 SEA FILE=JAPIO ABB=ON L63 AND C08?/IC

=> FILE COMPENDEX

FILE 'COMPENDEX' ENTERED AT 12:31:00 ON 13 MAY 2004  
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FILE LAST UPDATED: 10 MAY 2004 <20040510/UP>  
FILE COVERS 1970 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN  
THE BASIC INDEX >>>

=> D QUE L72

L33 32 SEA FILE=REGISTRY ABB=ON (9003-55-8/BI OR 112-02-7/BI OR  
12172-85-9/BI OR 12173-47-6/BI OR 12286-87-2/BI OR 12424-32-7/B  
I OR 1318-93-0/BI OR 1319-41-1/BI OR 1337-81-1/BI OR 14314-78-4  
/BI OR 185144-29-0/BI OR 188437-43-6/BI OR 2039-80-7/BI OR  
2155-94-4/BI OR 25103-58-6/BI OR 26762-93-6/BI OR 27776-21-2/BI  
OR 2867-47-2/BI OR 29383-23-1/BI OR 2997-92-4/BI OR 5339-11-7/  
BI OR 57-09-0/BI OR 7720-78-7/BI OR 7727-21-1/BI OR 7727-54-0/B  
I OR 78-67-1/BI OR 79-10-7/BI OR 79-41-4/BI OR 84092-72-8/BI  
OR 94-36-0/BI OR 94291-22-2/BI OR 96536-37-7/BI)  
L35 5 SEA FILE=REGISTRY ABB=ON 1318-93-0 OR 12172-85-9 OR 12173-47-6  
OR 12286-87-2 OR 12424-32-7  
L36 1 SEA FILE=REGISTRY ABB=ON 9003-55-8  
L37 26 SEA FILE=REGISTRY ABB=ON L33 NOT (L35 OR L36)  
L38 5 SEA FILE=REGISTRY ABB=ON L37 AND AMINIUM  
L39 7 SEA FILE=REGISTRY ABB=ON L37 AND AMMONIUM  
L40 14 SEA FILE=REGISTRY ABB=ON L37 AND 2/NC  
L41 13 SEA FILE=REGISTRY ABB=ON L40 NOT SAPONITE  
L42 13 SEA FILE=REGISTRY ABB=ON L38 OR L39 OR L41  
L43 187947 SEA FILE=HCAPLUS ABB=ON L35 OR CLAY# OR MONTMORILLONITE OR  
BEIDELLITE OR HECTORITE OR VOLKONSKOITE OR SAUCONITE OR  
SAPIOLITE OR BENTONITE  
L44 1 SEA FILE=HCAPLUS ABB=ON NONTRITE OR SOBOCKITE OR STERENSITE  
OR SINFORDITE  
L45 7733 SEA FILE=HCAPLUS ABB=ON (L43 OR L44) AND (SBR OR STYRENE(W) BUT  
ADIENE OR L36 OR RUBBER# OR ELASTOMER? OR LATEX)  
L46 382 SEA FILE=HCAPLUS ABB=ON L45 AND NANO?  
L47 587060 SEA FILE=HCAPLUS ABB=ON L42 OR CATION? OR QUAT?  
L72 9 SEA FILE=COMPENDEX ABB=ON L46 AND L47

=> DUP REM L61 L67 L73 L71 L74 L72

FILE 'HCAPLUS' ENTERED AT 12:31:41 ON 13 MAY 2004  
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FILE 'COMPENDEX' ENTERED AT 12:31:41 ON 13 MAY 2004  
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PROCESSING COMPLETED FOR L67  
PROCESSING COMPLETED FOR L73  
PROCESSING COMPLETED FOR L71  
PROCESSING COMPLETED FOR L74  
PROCESSING COMPLETED FOR L72

L75        59 DUP REM L61 L67 L73 L71 L74 L72 (9 DUPLICATES REMOVED)

=> D ALL L75 1-59

L75 ANSWER 1 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN  
AN 2004:41549 HCAPLUS  
DN 140:95433  
CD Entered STN: 18 Jan 2004  
TI Functionalized **elastomer nanocomposites** with improved  
air barrier properties for tire innerliners and innertubes  
IN Gong, Caiguo; Dias, Anthony J.; Tsou, Andy H.; Poole, Beverly J.; Karp,  
Kriss R.  
PA Exxonmobil Chemical Patents Inc., USA  
SO PCT Int. Appl., 49 pp.  
OT CODEN: PIXXD2  
LA Patent  
CC English  
IC ICM C08K003-34  
ICS C08L051-00  
CC 39-13 (Synthetic Elastomers and Natural **Rubber**)  
TAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2004005387	A1	20040115	WO 2003-US16944	20030530
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			

PRAI US 2002-394098P P 20020705

AB Title **nanocomposite** comprises a **clay** and an  
**elastomer** comprising at least C2-C10 olefin derived units; wherein  
the **elastomer** also comprises functionalized monomer units  
pendant to the **elastomer**. The **elastomer** include  
poly(isobutylene-co-p-alkylstyrene) **elastomers** and  
poly(isobutylene-co-isoprene) **elastomers**, which are  
functionalized via Friedel-Crafts reaction with a Lewis acid and a  
functionalizing agent such as acid anhydrides and/or acylhalides. The  
**clay** is exfoliated in one embodiment by the addition of exfoliating  
agents such as alkyl amines and silanes to the **clay**. The composition  
can include secondary **rubbers** such as general purpose  
**rubbers**, and curatives, fillers, and the like. Thus, a composition  
contains Cloisite 6A (**montmorillonite clays** treated  
with di-Me dihydrogenated tallow alkyl ammonium chloride) and succinic  
anhydride-modified XP 50 (isobutylene-methylstyrene **rubber**) in  
dichloromethane.  
functionalized **elastomer nanocomposite** tire innerliner  
innertube **clay**  
Synthetic **rubber**, uses  
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered  
material use); USES (Uses)  
(butadiene-isoprene-styrene; production of functionalized **elastomer**

nanocomposites containing **clay** for tire innerliners and innertubes)

IT Synthetic rubber, uses  
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)  
(butadiene-isoprene; production of functionalized **elastomer** nanocomposites containing **clay** for tire innerliners and innertubes)

IT Amines, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(diamines, vulcanization agents; production of functionalized elastomer nanocomposites containing **clay** for tire innerliners and innertubes)

IT Synthetic rubber, uses  
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)  
(ethylene-propene-styrene; production of functionalized **elastomer** nanocomposites containing **clay** for tire innerliners and innertubes)

IT Amines, miscellaneous  
Phosphines  
**Quaternary** ammonium compounds, miscellaneous

Sulfides, miscellaneous  
RL: MSC (Miscellaneous)  
(exfoliating agent for **clay**; production of functionalized elastomer nanocomposites containing **clay** for tire innerliners and innertubes)

IT Carbon black, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(filler; production of functionalized **elastomer** nanocomposites containing **clay** for tire innerliners and innertubes)

IT Tallow  
RL: MSC (Miscellaneous)  
(hydrogenated, di-Me, alkyl ammonium chloride, exfoliating agent for **clay**; production of functionalized **elastomer** nanocomposites containing **clay** for tire innerliners and innertubes)

IT Tires  
(inner tubes; production of functionalized **elastomer** nanocomposites containing **clay** for tire innerliners and innertubes)

IT Synthetic rubber, uses  
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)  
(isobutylene-methylstyrene, brominated, XP 50; production of functionalized **elastomer** nanocomposites containing **clay** for tire innerliners and innertubes)

IT Synthetic rubber, uses  
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)  
(isobutylene-methylstyrene; production of functionalized **elastomer** nanocomposites containing **clay** for tire innerliners and innertubes)

IT Clays, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(montmorillonitic, treated with di-Me dihydrogenated tallow alkyl ammonium chloride; production of functionalized **elastomer**

nanocomposites containing **clay** for tire innerliners and innertubes)

Amines, miscellaneous

RL: MSC (Miscellaneous)

(primary, exfoliating agent for **clay**; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

Fillers

#### Nanocomposites

Tires

Vulcanization accelerators and agents

(production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

Clays, uses

RL: MOA (Modifier or additive use); USES (Uses)

(production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

Butadiene **rubber**, uses

Butyl **rubber**, uses

Natural **rubber**, uses

**Styrene-butadiene rubber**, uses

RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)

(production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

Amines, miscellaneous

RL: MSC (Miscellaneous)

(secondary, exfoliating agent for **clay**; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

Isobutylene **rubber**

RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)

(star-branched; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

Amines, miscellaneous

RL: MSC (Miscellaneous)

(tertiary, exfoliating agent for **clay**; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

Epoxides

Epoxy resins, uses

Fatty acids, uses

Polyamines

RL: MOA (Modifier or additive use); USES (Uses)

(vulcanization agents; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

9003-17-2

RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)

(butadiene **rubber**, production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

9010-85-9

RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)

(butyl **rubber**, production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

75-09-2, Dichloromethane, uses 75-15-0, Carbon disulfide, uses 98-95-3, Nitrobenzene, uses 107-06-2, 1,2-Dichloroethane, uses 110-54-3, Hexane, uses 110-82-7, Cyclohexane, uses  
RL: NUU (Other use, unclassified); USES (Uses)  
(diluent; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

16749-13-6, Phosphonium 18155-21-0, Sulfonium  
RL: MSC (Miscellaneous)  
(exfoliating agent for **clay**; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

7631-86-9, Silica, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(filler; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

85-44-9, Phthalic anhydride 88-95-9, Phthaloyl dichloride 99-63-8, Isophthaloyl chloride 100-20-9, Terephthaloyl dichloride 108-30-5, Succinic anhydride, uses 108-31-6, Maleic anhydride, uses 108-55-4, Glutaric anhydride 111-19-3, Sebacoyl chloride 111-50-2, Adipoyl chloride 123-98-8, Azelaoyl chloride 142-79-0, Pimeloyl chloride 543-20-4, Succinyl chloride 616-02-4, Citraconic anhydride 1663-67-8, Malonyl chloride 1931-60-8 2170-03-8, Itaconic anhydride 2873-74-7, Glutaryl chloride 10027-07-3, Suberoyl chloride 44987-62-4, 3-Methyladipoyl chloride 54505-72-5, Diethylmalonyl chloride  
RL: MOA (Modifier or additive use); USES (Uses)  
(functionalizing agents; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

7446-70-0, Aluminum trichloride, uses  
RL: CAT (Catalyst use); USES (Uses)  
(grafting promotor; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

9003-27-4  
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)  
(isobutylene **rubber**, star-branched; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

252254-69-6, Cloisite 6A  
RL: MOA (Modifier or additive use); USES (Uses)  
(production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

25102-52-7, Butadiene-isoprene copolymer 25608-79-1, Ethylene-propene-styrene copolymer 26602-62-0, Butadiene-isoprene-styrene copolymer  
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)  
(**rubber**; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

9003-55-8  
RL: POF (Polymer in formulation); TEM (Technical or engineered

material use); USES (Uses)

(**styrene-butadiene rubber**, production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

T 1318-93-0, **Montmorillonite**, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(treated with di-Me dihydrogenated tallow alkyl ammonium chloride; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

T 557-05-1, Zinc stearate 7440-66-6, Zinc, uses 7704-34-9, Sulfur, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(vulcanization agents; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

E.CNT 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD

E

1) Toyoda Chuo Kenkyusho Kk; DE 19842845 A 1999 HCPLUS

75 ANSWER 2 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

N 2004-142966 [14] WPIX

NC C2004-057569

I Functionalized **elastomer nanocomposite** for used in,  
e.g. **tire** innerliner, comprises **clay**, and  
**elastomer** having olefin derived units and functionalized monomer  
units.

C A18 A95

N DIAS, A J; GONG, C; KARP, K R; POOLE, B J; TSOU, A H

A (ESSO) EXXONMOBIL CHEM PATENTS INC

YC 102

I WO 2004005388 A1 20040115 (200414)\* EN 54 C08K003-34

RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS  
LU MC MW MZ NL OA PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK  
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR  
KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT  
RO RU SC SD SE SG SK SL TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA  
ZM ZW

DT WO 2004005388 A1 WO 2003-US17204 20030530

RAI US 2002-394152P 20020705

C ICM C08K003-34

ICS C08C019-28; C08F008-00

B WO2004005388 A UPAB: 20040226

NOVELTY - A functionalized **elastomer nanocomposite**  
comprises **clay**, and **elastomer** having 2-10 carbon atoms  
(C) olefin derived units and functionalized monomer units.

DETAILED DESCRIPTION - Functionalized **elastomer**  
**nanocomposite** comprises **clay**; and **elastomer**  
having 2-10 carbon atoms (C) olefin derived units, and functionalized  
monomer units with functional groups pendant to the **elastomer**  
(E) from formula (I) or (II).

Q = O, or NR1;

R1 = H, 1-20C alkyls, alkenyls, or aryls, or substituted 1-20C  
alkyls, alkenyls, or aryls;

R2, 2' = H, 1-20C alkyls, alkenyls, or aryls, substituted 1-20C  
alkyls, alkenyls, or aryls, hydroxyl, or 1-20C alkoxy;

R3, R4 = -OR5 or -NHR5;

R5 = R1.

An INDEPENDENT CLAIM is also included for a method of forming

**nanocomposite** comprising contacting **elastomer**, functionalizing compound(s), free radical initiator(s), and **clay**

USE - For used in **tire** innerliner, innertube (claimed), and air barriers.

ADVANTAGE - The invention has improved air barrier properties.

Dwg.0/0

S CPI

A AB; GI

C CPI: A04-H00H; A08-R06B; A10-E01; A12-T01

75 ANSWER 3 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

N 2004-229520 [22] WPIX

NC C2004-090209

I Production of composite materials useful in the fields of packaging, liquid and gas storage and coatings comprises heating and shearing a mixture of a thermoplastic polymer and organophilic lamellar filler **particles**.

C A18 A28 A35 A92 A93 A95 A96 E37

N BAYET, A; BOUCARD, S; PRELE, P

A (MULT-N) MULTIBASE SA

YC 105

I FR 2842758 A1 20040130 (200422)\* 55 B29B007-90

WO 2004012917 A2 20040212 (200422) FR B29B000-00

RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS  
LU MC MW MZ NL OA PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW  
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK  
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR  
KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NI NO NZ OM PG PH  
PL PT RO RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ UA UG US UZ VC  
VN YU ZA ZM ZW

DT FR 2842758 A1 FR 2002-9509 20020726; WO 2004012917 A2 WO 2003-FR2335  
20030724

RAI FR 2002-9509 20020726

C ICM B29B000-00; B29B007-90

ICS B29C070-26; **C08K009-04**

CI B29K309:00

LB FR 2842758 A UPAB: 20040331

NOVELTY - Production of composite materials comprising inorganic filler **nanoparticles** in a thermoplastic polymer matrix comprises heating and shearing a mixture of a thermoplastic polymer and organophilic lamellar filler **particles** under pressure, reducing the shear rate to exfoliate the **particles** and degassing the mixture.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for composite materials produced as above.

USE - The composite materials are useful in the fields of packaging, liquid and gas storage and coatings, especially in (para)medical and (para)pharmaceutical fields and the fields of hygiene, cosmetics, petroleum, electrical construction, electrical appliances, toys, automobile, naval, aircraft and railway construction, building and space (all claimed).

ADVANTAGE - The filler **particles** are completely exfoliated and homogeneously dispersed in the polymer matrix.

Dwg.0/8

S CPI

A AB; DCN

IC CPI: A08-R01; A11-A; A11-A02B; A11-A03; E05-G03A; E05-T; E10-A22G;  
E10-B04D; E31-P02D

L75 ANSWER 4 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN  
AN 2004-271546 [26] WPIX  
DNC C2004-105556  
TI High-viscosity thermoplastic composition for extrusion blow molding  
comprises **nanoparticulate** filler, fibrous filler and impact  
modifier.  
DC A26 A88 A92 A95 E19 G02 Q32  
IN KETTL, R; STOEPPELMANN, G  
PA (INVE) EMS-CHEM AG  
CYC 32  
PI EP 1394197 A1 20040303 (200426)\* GE 15 C08K003-00 <--  
R: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LT LU LV  
MC MK NL PT RO SE SI SK TR  
DE 10239326 A1 20040318 (200426) C08K003-34 <--  
JP 2004083911 A 20040318 (200426) 20 C08L077-00 <--  
ADT EP 1394197 A1 EP 2003-15807 20030710; DE 10239326 A1 DE 2002-10239326  
20020827; JP 2004083911 A JP 2003-300226 20030825  
PRAI DE 2002-10239326 20020827  
IC ICM C08K003-00; C08K003-34; C08L077-00  
ICS B29B007-38; B65D001-02; C08J005-04; C08K007-02;  
C08L067-00; C08L067-02; C08L101-00  
ICI C08K003-00, C08K003:22, C08K003:40  
AB EP 1394197 A UPAB: 20040421  
NOVELTY - Thermoplastic (polyamide, polyester, polyetherester or  
polyesteramide) composition suitable for extrusion blow molding includes  
0.5-15 weight% of a **nanoparticulate** filler, 5-30 weight% of a fibrous  
filler and 3-12 weight% of an impact modifier.  
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:  
(1) production of the composition by either melting the polymer and  
incorporating the fillers and impact modifier in an extrusion process or  
mixing the thermoplastic, fillers and impact modifier at 160-350 deg. C  
and injecting up to 30 weight% of a liquid (especially **water**) into  
the melt;  
(2) shaped products produced using the composition;  
(3) production of the shaped products in one or more stages by  
coextrusion, extrusion blow molding, pressing or coating.  
USE - For extrusion blow molding to produce shaped products, hollow  
products (especially bottles), semifinished products, plates and tubes  
(all claimed).  
ADVANTAGE - The **nanoparticulate** filler increases the melt  
viscosity of the composition by at least 30% compared with conventional  
mineral fillers.

Dwg.0/0  
CPI GMPI  
AB; DCN  
MC CPI: A08-M09B; A08-R01; A09-A05A; A11-A03; A11-B07; A11-B10; A12-R01;  
E31-P03; E31-P05A; G02-A05

L75 ANSWER 5 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1  
AN 2004:169054 HCPLUS  
ED Entered STN: 02 Mar 2004  
TI Influence of **clay** on the vulcanization kinetics of  
fluoroelastomer **nanocomposites**  
AU Kader, M. Abdul; Nah, Changwoon  
CS Duckjin-gu, Duckjin-dong, 664-14, Department of Polymer Science and  
Technology, Chonbuk National University, Jeonju, Chonbuk, 561-756, S.  
Korea

SO Polymer (2004), 45(7), 2237-2247  
CODEN: POLMAG; ISSN: 0032-3861

PB Elsevier Science Ltd.

DT Journal

LA English

CC 39 (Synthetic Elastomers and Natural **Rubber**)

AB The vulcanization kinetics of gum and **montmorillonite** (Na-MMT) **clay** filled fluoroelatomer (FKM) **nanocomposite** was studied using both oscillating disk rheometer and differential scanning calorimetry under isothermal and dynamic conditions. The X-ray diffraction pattern of **clay** filled FKM showed a shift in d-spacing toward higher values indicating the formation of intercalated silicate layer. The cure characterization showed higher rate and state of vulcanization of modified **clay** filled compound than that of gum and unmodified **clay** filled FKM indicating the accelerating effect of **quaternary** ammonium salt modified **clay**.

Although the unmodified **clay** slowed down the cure reaction, there was marked increase in cure rate at higher level of curative. Higher loading of **clay** decreased the cure rate with lowering of maximum torque values. The presence of organoclay increased the torque value through the formation of confined **elastomer** network within the silicate galleries. The exptl. data obtained provided the evidence that the curing behavior illustrated autocatalytic characteristics. The kinetic parameters determined from the model equation had good agreement with the exptl. results. The calculated activation energy of the gum and **clay** filled systems indicated the ease of cure process with respect to the type of **clay**. The cure kinetics measured by different methods was well correlated with each other.

RE.CNT 36 THERE ARE 36 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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L75 ANSWER 6 OF 59 COMPENDEX COPYRIGHT 2004 EEI on STN  
AN 2004(16):6608 COMPENDEX  
TI Synthetic routes, properties and future applications of polymer-layered  
silicate **nanocomposites**.  
AU Ahmadi, S.J. (Department of Applied Chemistry Faculty of Science Harbin  
Institute of Technology, Harbin 150001, China); Huang, Y.D.; Li, W.  
SO Journal of Materials Science v 39 n 6 Mar 15 2004 2004.p 1919-1925  
CODEN: JMTSAS ISSN: 0022-2461  
PY 2004  
DT Journal  
TC Bibliography; Theoretical; Experimental  
LA English  
AB This paper focuses on polymer **nanocomposites** and their  
syntheses, properties and future applications, several of these  
application will be successful in the near future. This new type of  
materials, based on smectite **clays** usually rendered hydrophobic  
through ionic exchange of the sodium interlayer **cation** with an  
onium **cation**, may be prepared via various synthetic routes  
comprising exfoliation adsorption, in-situ intercalative polymerization  
and melt intercalation. The whole range of polymer matrices covered, i.e.,  
thermoplastics, thermosets and **elastomers**. Small addition -  
typically less than 6 wt% - of these **nanoscale** inorganic fillers  
promote concurrently several properties of the polymer materials,  
including tensile characteristics, heat distortion temperature, scratch  
resistance, gas permeability resistance, and flame retardancy. \$CPY 2004  
Kluwer Academic Publishers. 63 Refs.  
CC 815.1 Polymeric Materials; 933.1 Crystalline Solids; 549.1 Alkali Metals;  
818.2 Elastomers; 483.1 Soils and Soil Mechanics; 414 Masonry Materials  
CT \*Polymers; Crystal lattices; Van der Waals forces; Mechanical  
permeability; Elastic moduli; Intercalation compounds; Delamination;  
Nanostructured materials; Sodium; **Elastomers**;  
**Clay**; Silicates; Carbon carbon composites  
ST Interlayers; Flame retardancy; Scratch resistance

L75 ANSWER 7 OF 59 RAPRA COPYRIGHT 2004 RAPRA on STN  
AN R:908598 RAPRA FS Rapra Abstracts  
TI THERMOPLASTIC OLEFIN/**CLAY NANOCOMPOSITES**: MORPHOLOGY  
AND MECHANICAL PROPERTIES.  
AU Mehta S; Mirabella F M; Rufener K; Bafna A (Equistar Chemicals;  
Cincinnati, University)  
SO Journal of Applied Polymer Science 92, No.2, 15th April p.928-36  
ISSN: 0021-8995  
CODEN: JAPNAB  
PY 2004  
DT Journal  
LA English  
AB The use of a **quaternary** ammonium salt modified **clay**  
as filler in commercial thermoplastic polyolefin (TPO)

**nanocomposites**, prepared using masterbatching and final mixing processes by melt compounding, was examined by X-ray diffraction, transmission electron microscopy, atomic force microscopy, flexural and impact properties, and rheological properties. The masterbatching process utilised maleic anhydride grafted polypropylene as a compatibiliser with between **clay** and TPO, and **clay** levels of between 0.6 to 5.6 percent were tested in the final compound. Breakup of the ethylene propylene **rubber particles** in the TPO was observed as **clay** level increased, increasing melt viscosity, flexural modulus and impact strength in unnotched (Izod) impact samples, but reducing impact strength in notched samples. 20 refs.

C 42C1; 42C12; 611; 42C11C12; 51SCL; 627; 9511; 9518; 9912; 991; 9924;  
9.10.2; 9.11.2

C \*OG; KE; MB; UL; UG; UJ; UK

T ATOMIC FORCE MICROSCOPY; CHARACTERISATION; CHARACTERIZATION; CHEMICAL MODIFICATION; COMPATIBILISER; COMPATIBILIZER; COMPOUND; DATA; DIFFRACTION; DISPERSION; **ELASTOMER**; EPM; EPR; ETHYLENE-PROPYLENE COPOLYMER; FILLER; FLEXURAL PROPERTIES; FRACTURE MORPHOLOGY; GRAPH; IMPACT PROPERTIES; INSTITUTION; MALEIC ANHYDRIDE GROUP; MECHANICAL PROPERTIES; MELT FLOW INDEX; MELT INDEX; MICROGRAPHY; MICROSCOPY; MODIFICATION; MORPHOLOGICAL PROPERTIES; MORPHOLOGY; **NANOCOMPOSITE**; **PARTICLE SIZE**; PLASTIC; POLYPROPENE; POLYPROPYLENE; PP; PROPENE POLYMER; PROPERTIES; PROPYLENE POLYMER; PROPYLENE-ETHYLENE COPOLYMER; RHEOLOGICAL PROPERTIES; RHEOLOGY; SCANNING ELECTRON MICROSCOPY; SCATTERING; TABLES; TECHNICAL; TEM; THERMOPLASTIC; **THERMOPLASTIC ELASTOMER**; **THERMOPLASTIC RUBBER**; TRANSMISSION ELECTRON MICROSCOPY; X-RAY DIFFRACTION; X-RAY SCATTERING

PT CLAY

HR **NANOCOMPOSITES**, olefin polymers, fillers, compounding, characterisation; FILLERS OF, **clay**; FILLERS IN, olefin polymers; MIXING, melt mixing, masterbatching, final mixing, fillers, olefin polymers, compatibilisers; COMPATIBILISERS, propylene polymers; PROPYLENE POLYMERS, compatibilisers, maleic anhydride grafted; CHARACTERISATION, **nanocomposites**, olefin polymers, rheological properties, X-ray diffraction, impact properties, flexural properties, microscopy, TEM, atomic force microscopy

T USA

N CLOISITE 20A

75 ANSWER 8 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN

N 2003:970411 HCAPLUS

N 140:147475

D Entered STN: 12 Dec 2003

I Melt-compounded natural **rubber nanocomposites** with pristine and organophilic layered silicates of natural and synthetic origin

U Varghese, Siby; Karger-kocsis, J.

S Institut fuer Verbundwerkstoffe GmbH, Kaiserslautern University of Technology, Kaiserslautern, D-67663, Germany

O Journal of Applied Polymer Science (2004), 91(2), 813-819

CODEN: JAPNAB; ISSN: 0021-8995

B John Wiley & Sons, Inc.

T Journal

A English

C 39-9 (Synthetic Elastomers and Natural **Rubber**)

B Composites based on natural **rubber** (NR) and containing organophilic and pristine layered silicates of natural and synthetic origin were produced by melt compounding and sulfur curing. The curing, thermomech.,

and mech. properties of the mixes, which contained 10 phr (parts per hundred parts of **rubber**) silicates, were determined. The dispersion of the silicates was studied by X-ray diffraction (XRD) and transmission electron microscopy (TEM). Organophilic **clays** accelerated the sulfur curing of NR, which was believed to occur because of a complexation reaction in which the amine groups of the **clay** intercalants participated. The property improvements caused by the fillers were ranked as follows: organophilic **clays** > pristine synthetic layered silicate (sodium fluorohectorite) > pristine natural **clay** (purified sodium **bentonite**) > precipitated nonlayered silica (used as a reference). This was attributed to partial intercalation of the organophilic **clay** by NR on the basis of XRD and TEM results and to the high aspect ratio of the fluorohectorite. Apart from intercalation, severe confinement (i.e., the collapse of the interlayer distance) of the organoclays was observed. This peculiar feature was traced to the formation of a zinc coordination complex, which extracted the amine intercalant of the organoclays, thus causing the collapse of the layers.

**montmorillonite** mica layered silicate composite natural **rubber**

**Quaternary ammonium compounds, uses**

RL: MOA (Modifier or additive use); USES (Uses)

(bis(hydroxyethyl)methyltallow alkyl, chlorides,  
**montmorillonite** modifying agent; melt-compounded natural  
**rubber nanocomposites** with pristine and organophilic  
layered silicates of natural and synthetic origin)

Hardness (mechanical)

Storage modulus

Tensile strength

(melt-compounded natural **rubber nanocomposites** with  
pristine and organophilic layered silicates of natural and synthetic  
origin)

Natural **rubber**, properties

RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)

(melt-compounded natural **rubber nanocomposites** with  
pristine and organophilic layered silicates of natural and synthetic  
origin)

Intercalation compounds

RL: PRP (Properties)

(melt-compounded natural **rubber nanocomposites** with  
pristine and organophilic layered silicates of natural and synthetic  
origin)

Deformation (mechanical)

(resilience; melt-compounded natural **rubber**  
**nanocomposites** with pristine and organophilic layered silicates  
of natural and synthetic origin)

**Bentonite**, properties

RL: PRP (Properties)

(sodian; melt-compounded natural **rubber**  
**nanocomposites** with pristine and organophilic layered silicates  
of natural and synthetic origin)

Strength

(tearing; melt-compounded natural **rubber**  
**nanocomposites** with pristine and organophilic layered silicates  
of natural and synthetic origin)

1318-93-0, **Montmorillonite**, properties 7631-86-9,  
Ultrasil VN2, properties 182636-27-7, Somasif ME 100 309295-00-9,  
Cloisite 30B 402944-35-8, **Nanomer** I 30P

RL: PRP (Properties)

(melt-compounded natural **rubber nanocomposites** with  
pristine and organophilic layered silicates of natural and synthetic  
origin)

T 124-30-1, Octadecylamine

RL: MOA (Modifier or additive use); USES (Uses)

(**montmorillonite** modifying agent; melt-compounded natural  
**rubber nanocomposites** with pristine and organophilic  
layered silicates of natural and synthetic origin)

E.CNT 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD

E

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- 25) Zhang, L; J Appl Polym Sci 2000, V78, P1873 HCPLUS

75 ANSWER 9 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

N 2003:899853 HCPLUS

D Entered STN: 18 Nov 2003

I Influence of **clay** modification on the structure and mechanical  
properties of EPDM/**montmorillonite nanocomposites**

U Zheng, Hua; Zhang, Yong; Peng, Zonglin; Zhang, Yinxi

S School of Chemistry and Chemical Technology, Skate Key Laboratory of Metal  
Matrix Composites, Shanghai Jiao Tong University, Shanghai, 200240, Peop.  
Rep. China

O Polymer Testing (2004), 23(2), 217-223

CODEN: POTEDZ; ISSN: 0142-9418

B Elsevier Science Ltd.

T Journal

A English

C 39-12 (Synthetic Elastomers and Natural **Rubber**)

Section cross-reference(s): 37

B Conditions were established for dispersing organic **montmorillonite**  
(OMMT) **nano** layers into ethylene-propylene-diene **rubber**  
(EPDM) matrix in a HAAKE mixer. The exptl. results of X-ray diffraction  
and transmission electron microscopy showed that the MMT modified with  
trimethyl-octadecyl amine or dimethylbenzyl-octadecyl amine existed in the  
form of an intercalated layer structure and the MMT modified with

methyl-bis(2-hydroxyethyl)cocoalkylamine was fully exfoliated in the EPDM matrix. The expansion of the distance between the silicate layers firstly took place after the HAAKE mixing, then the silicate layers were exfoliated in the EPDM matrix after the EPDM/OMMT composite was cured. The EPDM/OMMT composites had good mech. properties. The EPDM composite containing 15 weight% OMMT which was modified with the alkylamine containing hydroxyl

groups showed high tensile strength of 25 MPa. Dynamic mech. anal. revealed that the glass transition temperature ( $T_g$ ) of the composites was higher

than that of gum EPDM vulcanizate. The OMMT had delaying effects on the vulcanization reaction and decreased the crosslink d. of the EPDM/OMMT composites.

ST EPDM **montmorillonite** alkylammonium hybrid **nanocomposite**  
T torque intercalation exfoliation; **nanocomposite** vulcanization  
viscoelasticity mech loss hardness tensile strength morphol

EPDM **rubber**

RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)  
(Nordel IP-NDR 4770R; **clay** modification of EPDM/**montmorillonite nanocomposites**)

T Elongation at break

Exfoliation

Hardness (mechanical)

Hybrid organic-inorganic materials

Intercalation

Mechanical loss

**Nanocomposites**

Tensile strength

Torque

Viscoelasticity

Vulcanization

Young's modulus

(**clay** modification of EPDM/**montmorillonite nanocomposites**)

T Reinforced plastics

RL: PRP (Properties)

(**clay** modification of EPDM/**montmorillonite nanocomposites**)

T **Quaternary ammonium compounds**

RL: MOA (Modifier or additive use); USES (Uses)

(coco alkylbis(hydroxyethyl)methyl, chlorides, **montmorillonite** modification product; **clay** modification of EPDM/**montmorillonite nanocomposites**)

T EPDM **rubber**

RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)  
(ethylene-ethylideneborbornene-propene; **clay** modification of EPDM/**montmorillonite nanocomposites**)

T Polymer morphology

(micromorphol.; **clay** modification of EPDM/**montmorillonite nanocomposites**)

T **Clays**

RL: MOA (Modifier or additive use); USES (Uses)  
(montmorillonitic; **clay** modification of EPDM/**montmorillonite nanocomposites**)

T Strength

(tearing; **clay** modification of EPDM/**montmorillonite nanocomposites**)

T 1318-93-0D, **Montmorillonite, quaternary**

ammonium ions-exchanged 15461-40-2D, Trimethyloctadecylammonium, reaction product with **montmorillonite** 37612-69-4D, reaction product with **montmorillonite**

RL: MOA (Modifier or additive use); USES (Uses)  
(**clay** modification of EPDM/**montmorillonite**  
**nanocomposites**)

RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD

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75 ANSWER 10 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2  
AN 2003:590853 HCPLUS

N 139:150919

D Entered STN: 01 Aug 2003

I A process for preparing **nanocomposite** from functionalized diene-based **elastomer** and layered **clay**

N Ajbani, Manoj; Geiser, Joseph Frank; Parker, Dane Kenton

A USA

O U.S. Pat. Appl. Publ., 15 pp.

CODEN: USXXCO

T Patent

A English

C ICM C08K003-34

CL 524445000; 524449000

C 39-9 (Synthetic Elastomers and Natural **Rubber**)

AN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
I	US 2003144401	A1	20030731	US 2001-37009	20011221
RAI	US 2001-37009		20011221		

B The title process comprises blending an **aqueous** dispersion (A) of a functionalized diene-based **elastomer** having Tg (-120)-10° and mol. weight 1000-1,000,000, and a multilayered swellable silicate **clay**. The **nanocomposites** in this invention are useful for manufacture of articles such as tires including tire tread, tire sidewall and/or tire inner liner. In one example 39.1 g a maleated butadiene **rubber** (Ricon 131MA20) was dispersed in solution containing 4.1 g Triton X 100 (surfactant) and 750 mL **water** at 75°, added with 2.06 g NaOH to pH 8-8.5, then mixed with 69.05 g Cloisite 30B (organic

T **clay**) to give a title **nanocomposite**.  
functionalized diene **elastomer** layered **clay**  
**nanocomposite** prep process; tire tread sidewall belt butadiene  
**rubber clay nanocomposite** prep  
T **Synthetic rubber**, properties  
RL: **POF (Polymer in formulation)**; PRP (Properties); TEM  
(Technical or engineered material use); USES (Uses)  
(butadiene-isoprene; **nanocomposite** from functionalized  
diene-based **elastomer** and layered **clay** useful for  
tire products)

T **Quaternary ammonium compounds**, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(**clay** intercalating agent; **nanocomposite** from  
functionalized diene-based **elastomer** and layered **clay**  
useful for tire products)

T **Clays**, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(intercalated; **nanocomposite** from functionalized diene-based  
**elastomer** and layered **clay** useful for tire products)

T **Tires**  
(liners; **nanocomposite** from functionalized diene-based  
**elastomer** and layered **clay** useful therefor)

T **Butadiene rubber**, properties  
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PYP (Physical process); TEM  
(Technical or engineered material use); PROC (Process); USES (Uses)  
(maleated, Ricon 131MA20; prepns. of **nanocomposite** from  
functionalized diene-based **elastomer** and layered **clay**  
)

T **Isoprene-styrene rubber**  
**Styrene-butadiene rubber**, properties  
RL: **POF (Polymer in formulation)**; PRP (Properties); TEM  
(Technical or engineered material use); USES (Uses)  
(**nanocomposite** from functionalized diene-based  
**elastomer** and layered **clay** useful for tire products)

T **Nanocomposites**  
(of functionalized diene-based **elastomer** and layered  
**clay** useful for tire products)

T **Tires**  
(sidewalls; **nanocomposite** from functionalized diene-based  
**elastomer** and layered **clay** useful therefor)

T **Tires**  
(treads; **nanocomposite** from functionalized diene-based  
**elastomer** and layered **clay** useful therefor)

T 9003-17-2  
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PYP (Physical process); TEM  
(Technical or engineered material use); PROC (Process); USES (Uses)  
(butadiene **rubber**, maleated, Ricon 131MA20; prepns. of  
**nanocomposite** from functionalized diene-based **elastomer**  
and layered **clay**)

T 25038-32-8  
RL: **POF (Polymer in formulation)**; PRP (Properties); TEM  
(Technical or engineered material use); USES (Uses)  
(isoprene-styrene **rubber**, **nanocomposite** from  
functionalized diene-based **elastomer** and layered **clay**  
useful for tire products)

T **1318-93-0**, Cloisite Nat, uses 214474-11-0, Cloisite 15A

292833-56-8, Cloisite 25A 309295-00-9, Cloisite 30B  
 RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)  
 (preps. of **nanocomposite** from functionalized diene-based **elastomer** and layered **clay**)

IT 9003-55-8

RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
 (styrene-butadiene rubber,  
**nanocomposite** from functionalized diene-based **elastomer** and layered **clay** useful for tire products)

IT 9002-93-1, Triton X 100

RL: NUU (Other use, unclassified); USES (Uses)  
 (surfactant; preps. of **nanocomposite** from functionalized diene-based **elastomer** and layered **clay**)

L75 ANSWER 11 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 3  
 AN 2003:488625 HCAPLUS

DN 139:54173

ED Entered STN: 27 Jun 2003

TI *Applicant*  
**Nanocomposite** and exfoliated **clay platelets**formed in situ within **elastomer** for tires

IN Parker, Dane Kenton; Larson, Brent Kevin; Yang, Xiaoping

PA The Goodyear Tire &amp; Rubber Company, USA

SO Eur. Pat. Appl., 18 pp.

DT CODEN: EPXXDW

LA Patent

IC English

ICM C08K009-00

ICS C08K009-04; C08K009-06; C08K003-00; C08K003-34; C08K003-36;  
 C08L009-00; C08L021-00; C08J003-215CC 39-13 (Synthetic Elastomers and Natural **Rubber**)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1321489	A1	20030625	EP 2002-28118	20021218
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK				
US 2004054059	A1	20040318	US 2001-37539	20011221
JP 2003192833	A2	20030709	JP 2002-372736	20021224

PRAI US 2001-37539 A 20011221

AB This invention relates to preparation and use of **nanocomposites** comprised of an **elastomer** matrix containing a dispersion therein of at least partially exfoliated **platelets** of an intercalated, multilayered, water swellable **clay** (e.g. **montmorillonite clay**). The exfoliated **platelets** are derived from such intercalated **clay** formed by an in situ **cation exchange** phenomenon between **cationically** exchangeable ions within the galleries between the layers of the multilayered **clay** with a pre-formed **latex** of **cationic** (pos. charged) **elastomer particles**. The pos. charged **latex elastomer particles** may be prepared by free radical emulsion polymerization using: (A) a non-polymerizable **cationic** surfactant, and/or (B) a polymerizable **cationic** surfactant. Optionally, an addnl. **cationic** charge may be incorporated onto the **cationic** **elastomer latex particles** through the use and in the presence of: (C) a polymerizable comonomer bearing a

**cationic** charge, (D) a free radical generating polymerization initiator bearing a **cationic** charge, and/or (E) a free radical chain transfer agent bearing a **cationic** charge. Such free radical induced emulsion polymns. are exclusive of a thermoplastic polymer latex and are exclusive of the presence of an anionic surfactant. Rubber composites can be prepared by blending such **nanocomposite** with addnl. **elastomer**(s), addnl. reinforcing filler(s) and/or a coupling agent. The invention further relates to the preparation of articles of manufacture, including tires, having

at least one component comprised of said **nanocomposite** or said **rubber** composite. Such a tire component may be selected from, for example, tire tread and tire inner liner.

ST **nanocomposite** exfoliated **clay platelet**

IT **elastomer** tire tread inner liner

Polymerization catalysts

IT (anionic; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Polymerization catalysts

Surfactants

IT (cationic; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Clay minerals

IT RL: MOA (Modifier or additive use); USES (Uses)

IT (hectorite-like; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Tires

IT (liners, inner liner; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Clays, uses

IT RL: TEM (Technical or engineered material use); USES (Uses)

IT (montmorillonitic; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Nanocomposites

Nanoparticles

Tires

IT (preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Styrene-butadiene rubber, preparation

IT RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

IT (preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Polymerization catalysts

IT (radical, redox; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Polymerization catalysts

IT (radical; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Tires

IT (treads; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT 7727-21-1, Potassium peroxydisulfate 7727-54-0, Ammonium peroxydisulfate  
RL: CAT (Catalyst use); USES (Uses)  
(anionic polymerization initiators; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT 2997-92-4, 2,2'-Azobis(2-methylpropionamidine) dihydrochloride  
27776-21-2  
RL: CAT (Catalyst use); USES (Uses)  
(cationic polymerization initiators; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT 1318-93-0, Montmorillonite, uses 12172-85-9,  
Beidellite 12173-47-6, Hectorite  
12286-87-2, Volkonskoite 12424-32-7,  
Sauconite  
RL: MOA (Modifier or additive use); USES (Uses)  
(clays; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT 78-67-1, AIBN 94-36-0, Benzoyl peroxide, uses 26762-93-6  
RL: CAT (Catalyst use); USES (Uses)  
(free radical polymerization initiators; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT 79-10-7D, Acrylic acid, esters, mono and diquaternary ammonium salts  
79-41-4D, Methacrylic acid, esters, mono and diquaternary ammonium salts  
1337-81-1D, Vinyl pyridine, alkyl bromide or chloride **quaternary** salts  
2039-80-7D, p-Vinylbenzene dimethylamine, alkyl bromide or chloride **quaternary** salts  
2155-94-4D, N,N-Dimethylallylamine, alkyl bromide or chloride **quaternary** salts  
2867-47-2D, 2-Dimethylaminoethyl methacrylate, alkyl bromide or chloride **quaternary** salts  
5339-11-7D, m-Vinylbenzene dimethylamine, alkyl bromide or chloride **quaternary** salts 14314-78-4  
29383-23-1D, Vinyl imidazole, alkyl bromide or chloride **quaternary** salts  
84092-72-8, Vinylbenzylamine hydrochloride  
94291-22-2, 11-Acryloylundecyltrimethylammonium bromide  
96536-37-7, 11-Methacryloylundecyltrimethylammonium bromide  
185144-29-0, 5-(Para-vinylphenyl) pentyltrimethylammonium bromide  
188437-43-6, N-((11-Methacryloyloxy)undecyl-4-methyl pyridinium bromide  
RL: MOA (Modifier or additive use); USES (Uses)  
(free radically polymerizable **cationic** surfactant; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT 25103-58-6, tert-Dodecanethiol  
RL: MOA (Modifier or additive use); USES (Uses)  
(mol. weight regulators; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT 57-09-0, Cetyl trimethyl ammonium bromide  
RL: MOA (Modifier or additive use); USES (Uses)  
(non free-radically polymerizable **cationic** surfactant; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT 112-02-7, Cetyltrimethylammonium chloride  
RL: MOA (Modifier or additive use); USES (Uses)  
(non free-radically polymerizable **cationic** surfactants;

preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)  
IT 1319-41-1, Saponite  
RL: MOA (Modifier or additive use); USES (Uses)  
(preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)  
IT 7720-78-7, Ferrous sulfate  
RL: CAT (Catalyst use); USES (Uses)  
(redox free radical polymerization initiators; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)  
IT 9003-55-8P, Styrene-1,3-butadiene copolymer  
RL: IMF (Industrial manufacture); POF (**Polymer in formulation**);  
TEM (Technical or engineered material use); PREP (Preparation); USES  
(Uses)  
(rubbers; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)  
IT 9003-55-8P  
RL: IMF (Industrial manufacture); POF (**Polymer in formulation**);  
TEM (Technical or engineered material use); PREP (Preparation); USES  
(Uses)  
(**styrene-butadiene rubber**, preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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- (2) Exxon Research Engineering Co; WO 9700910 A 1997 HCPLUS
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L75 ANSWER 12 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 2003:299060 HCPLUS

DN 138:322521

ED Entered STN: 18 Apr 2003

TI **Rubber** composition with high vibration damping capacity

IN Taguchi, Takehiko; Shinohara, Koji

PA Tokai Rubber Industries, Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C08L021-00

ICS C08K009-04; F16F015-08; B60K005-12

CC 39-9 (Synthetic Elastomers and Natural **Rubber**)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI JP 2003113271 A2 20030418 JP 2001-305489 20011001

PRAI JP 2001-305489 20011001

AB The **rubber** composition contains layered **clay** minerals, which form **nanodispersion (nanocomposite)** at 2-10 layers, i.e., not at single layer structure. The composition, showing damping capacity from low to high temperature region, is made into a vibration damper

or an automobile engine mount. Thus, 10 g Na-**montmorillonite** and 5 g di(hardened tallow alkyl)dimethylammonium chloride were subjected to ion exchanging to give an organic smectite, 10 parts of which was mixed with

ST natural **rubber** 100, ZnO 5, stearic acid 1, S 2, and a vulcanization accelerator 1 part and vulcanized to give test pieces showing large loss tangent in wide range of temperature  
**rubber** high vibration damping capacity **nanocomposite**; layered **clay** mineral multilayered **nanodispersion** **rubber**; natural **rubber** modified **montmorillonite** vibration damper; org ammonium chloride modified sodium **montmorillonite**; engine mount vibration damper **rubber** compn

IT **Quaternary** ammonium compounds, preparation  
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); PREP (Preparation); USES (Uses)  
(ion-exchanged with sodium-**montmorillonite**; **rubber** composition containing **nanodispersion** of layered **clay** mineral with high vibration damping capacity)

IT **Clay** minerals  
RL: MOA (Modifier or additive use); USES (Uses)  
(layered; **rubber** composition containing **nanodispersion** of layered **clay** mineral with high vibration damping capacity)

IT **Nanocomposites**  
Vibration dampers  
(**rubber** composition containing **nanodispersion** of layered **clay** mineral with high vibration damping capacity)

IT Natural **rubber**, uses  
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)  
(**rubber** composition containing **nanodispersion** of layered **clay** mineral with high vibration damping capacity)

IT Internal combustion engines  
(**rubber** composition containing **nanodispersion** of layered **clay** mineral with high vibration damping capacity for)

IT 1318-93-0DP, Montmorillonite ((All.33-1.67Mg0.33-0.67)(Ca0-1Na0-1)0.33Si4(OH)2010.xH2O), ion-exchanged with **quaternary** ammonium chloride, preparation  
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); PREP (Preparation); USES (Uses)  
(sodium-rich; **rubber** composition containing **nanodispersion** of layered **clay** mineral with high vibration damping capacity)

L75 ANSWER 13 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 2003:146523 HCPLUS

DN 138:189235

ED Entered STN: 26 Feb 2003

TI Composition of modified butyl **rubber** containing layered **clay** minerals

IN Maruyama, Tsukasa; Sekine, Yuko; Ishikawa, Kazunori

PA Yokohama Rubber Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C08L023-32

ICS C08K003-34

CC 39-9 (Synthetic Elastomers and Natural **Rubber**)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
JP 2003055514	A2	20030226	JP 2001-244337	20010810

PRAI JP 2001-244337

20010810

AB The composition contains the modified butyl **rubber** substituted with phosphonium salt group and layered **clay** minerals treated with organic compds. wherein **nanocomposites** of the layered **clay** minerals uniformly dispersed in the **rubber** are formed. Thus, 100 g Na-type **montmorillonite** (Kunipia F) was added to water containing 93.2 g dioleyldimethylammonium chloride to give the treated **clay** mineral, 8 parts of which was mixed with 100 parts butyl **rubber** (Exxpro, brominated) and 5 parts PPh<sub>3</sub> and molded to give a sheet showing no x-ray diffraction peaks corresponding to **clay** minerals and good solubility to MePh.

ST butyl **rubber** **nanocomposite** layered **clay** mineral; org compd treated layered **clay** mineral dispersibility; phosphonium salt butyl **rubber** **clay** mineral; dioleyldimethylammonium chloride modified sodium **montmorillonite**

IT **Nanocomposites**

(butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)

IT Phosphonium compounds

IT RL: TEM (Technical or engineered material use); USES (Uses)  
(butyl **rubber**; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)

IT Synthetic **rubber**, uses

IT RL: TEM (Technical or engineered material use); USES (Uses)  
(isobutylene-methylstyrene, brominated, Exxpro, phosphonium salts; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)

IT Materials

(layered; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)

IT **Clay** minerals

IT RL: MOA (Modifier or additive use); USES (Uses)  
(layered; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)

IT Butyl **rubber**, uses

IT RL: TEM (Technical or engineered material use); USES (Uses)  
(phosphonium salts; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)

IT 7212-69-3, Dioleyldimethylammonium chloride

IT RL: MOA (Modifier or additive use); USES (Uses)  
(Nissan Cation 20L; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)

IT 187247-40-1, Kunipia F

IT RL: MOA (Modifier or additive use); USES (Uses)  
(butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)

IT 9010-85-9

IT RL: TEM (Technical or engineered material use); USES (Uses)  
(butyl **rubber**, phosphonium salts; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)

IT 603-35-0D, Triphenylphosphine, salt with butyl **rubber**

IT RL: TEM (Technical or engineered material use); USES (Uses)  
(in butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)

L75 ANSWER 14 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN  
AN 2003-865200 [80] WPIX  
DNC C2003-244582  
TI Cross-linkable and/or cross-linked **nanofiller** composition for  
use in use in manufacturing articles e.g. tube, pipe, film, or tile,  
comprises ethylene (co)polymer and intercalated **nanofiller**.  
DC A17 A92 A93 E37  
IN MAYER, H A; MCMAHON, W J  
PA (COMP-N) COMPCO PTY LTD  
CYC 103  
PI WO 2003082966 A1 20031009 (200380)\* EN 47 C08K003-34 <--  
RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS  
LU MC MW MZ NL OA PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW  
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK  
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR  
KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NI NO NZ OM PH PL  
PT RO RU SC SD SE SG SK SL TJ TM TN TR TT TZ UA UG US UZ VC VN YU  
ZA ZM ZW  
ADT WO 2003082966 A1 WO 2003-AU385 20030328  
PRAI AU 2002-1464 20020328  
IC ICM **C08K003-34**  
AB WO2003082966 A UPAB: 20031211  
NOVELTY - A cross-linkable and/or cross-linked **nanofiller**  
composition comprises ethylene (co)polymer and intercalated  
**nanofiller**.  
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:  
(a) preparing a cross-linkable and/or cross-linked **nanofiller**  
composition comprising mixing and delaminating and/or exfoliating in one  
step a cross-linkable and/or cross-linked ethylene (co)polymer and an  
intercalated **nanofiller**, delaminating and/or exfoliating the  
**nanofiller**, or delaminating and/or exfoliating intercalated  
**nanofiller**, and mixing the delaminated and/or exfoliated and  
intercalated **nanofiller** with a cross-linkable and/or  
cross-linked ethylene (co)polymer; and  
(b) preparing the article comprising forming or shaping the  
**nanofiller** composition, or combining the layers of the  
**nanofiller** composition with the other layer, cross-linking the  
**nanofiller** composition, and heating and stretching the  
**nanofiller** composition and cooling the stretched composition.  
USE - The composition is for use in manufacturing articles e.g.,  
tube, pipe, film, sheet, tile, floor covering, container or packaging for  
food (claimed).  
It can be used in applications such as medical (e.g. protective gear  
and clothing, medicine containers, or layered products); defense and work  
protection (e.g. protection against external chemicals, or substances);  
transport (e.g. in land vehicles, trains, subways sea ships, air transport  
or liquids or gases such as pipelines, pipes for hot **water** under  
pressure and gas); constructions (e.g. high rise, towers, installations  
and rooms with electronics, switches, computers, offices, public areas,  
theatres, cinemas, malls, stations, airports, telecom installations,  
storage pipes and tubes); agriculture; food (e.g. packaging of  
consumables, protecting food in laminated films); and packaging (of  
chemicals, paints, liquid solutions, dispersions, and **aqueous** or  
solvent based).  
ADVANTAGE - The inventive composition possess increased barrier  
properties, strength and higher heat distortion temperatures.  
Dwg.0/0

FS CPI  
 FA AB; DCN  
 MC CPI: A04-G01B; A08-R01; A11-B01; E10-A04B1D; E10-A04B2D; E10-A21; E10-A22;  
     E10-A22A; E10-A22E; E10-A22G; E31-D04; E31-P02D; E31-P04; E31-P05;  
     E34-B02; E34-C02; E34-D; E34-D03

L75 ANSWER 15 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN  
 AN 2003-814973 [77] WPIX  
 DNN N2003-652317 DNC C2003-226972  
 TI Hydraulic pipe for automobiles has at least one layer made from a polyamide molding composition containing **nano** scale filler.  
 DC A23 A88 E37 P73 Q67  
 IN HOFFMANN, M; STOEPPELMANN, G; STOPPELMANN, G  
 PA (INVE) EMS-CHEM AG; (HOFF-I) HOFFMANN M; (STOP-I) STOPPELMANN G  
 CYC 33  
 PI EP 1333052 A1 20030806 (200377)\* GE 11 C08K003-22 <--  
     R: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LI LT LU LV MC  
     MK NL PT RO SE SI SK TR  
 DE 10204395 A1 20030918 (200377) F16L011-04  
 JP 2003247672 A 20030905 (200377) 9 F16L011-04  
 US 2003190444 A1 20031009 (200377) B32B001-08  
 KR 2003066350 A 20030809 (200402) F16L009-14  
 DE 10204395 B4 20040129 (200408) F16L011-04  
 ADT EP 1333052 A1 EP 2002-28270 20021216; DE 10204395 A1 DE 2002-10204395  
 20020204; JP 2003247672 A JP 2003-19329 20030128; US 2003190444 A1 US  
 2003-357104 20030203; KR 2003066350 A KR 2003-5136 20030127; DE 10204395  
 B4 DE 2002-10204395 20020204  
 PRAI DE 2002-10204395 20020204  
 IC ICM B32B001-08; **C08K003-22**; F16L009-14; F16L011-04  
 ICS B29D023-00; B32B027-20; B32B027-34; **C08K009-04**;  
**C08L077-00**  
 AB EP 1333052 A UPAB: 20031128

NOVELTY - A hydraulic pipe for automobiles is based on thermoplastic polymers and contains at least one layer made from a polyamide molding composition containing 0.5-50, preferably 1-30, weight% of a **nano** scale filler per 100 weight% of the polymer matrix.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for preparation of the hydraulic pipe (HP) as described below in one or more stages by injection molding, coextrusion, extrusion-blown forming, pressing, or by a sheathing (sic) process.

USE - The HP is useful for hydraulic liquid transport, especially for automobile brake pipes and couplings.

ADVANTAGE - Surprisingly the HP containing **nano** scale fillers have increased barrier action against **water** and the permeation of gases and liquids, increased rupture strength up to 130 deg. C, decreased volume changes over the temperature range -40 to 130 deg. C, a **water** permeation into the HP of less than 2-3%, show no degradation reaction in contact with hydraulic fluids and show good cold impact strength down to -40 deg. C.

Dwg.0/0

FS CPI GMPI  
 FA AB; DCN  
 MC CPI: A05-F01E2; A08-R01; A12-H02; A12-T04C; E05-E; E31-N04B; E31-P02;  
     E31-P03; E31-P04; E31-P05; E34-B01; E34-B02; E34-C02; E34-E; E35

L75 ANSWER 16 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN  
 AN 2003:517602 HCPLUS  
 DN 139:246420

ED Entered STN: 08 Jul 2003  
TI A new approach to polymer/**montmorillonite nanocomposites**  
AU Ma, Jun; Xu, Jian; Ren, Jian-Hui; Yu, Zhong-Zhen; Mai, Yiu-Wing  
CS Mechanical and Mechatronic Engineering, School of Aerospace, Centre for Advanced Materials Technology, The University of Sydney, Sydney, NSW 2006, Australia  
SO Polymer (2003), 44(16), 4619-4624  
CODEN: POLMAG; ISSN: 0032-3861  
PB Elsevier Science Ltd.  
DT Journal  
LA English  
CC 37-5 (Plastics Manufacture and Processing)  
Section cross-reference(s): 39  
AB A novel method for preparation of exfoliated/intercalated **nanocomposites** is reported based on two steps, i.e. preparation of treated-**montmorillonite** (MMT) solution and solution blending with polymers. After in situ polymerization of dimethyldichlorosilane between layers and separation of most polydimethylsiloxane (PDMS), the treated-MMT solution shows good storage stability. Although elemental analyzer shows no residue PDMS, NMR proves residue PDMS still exists in the solution. The residue PDMS is believed to graft onto the MMT layer surface via condensation of hydroxyl groups of PDMS and those that existed on MMT surface. Lower relaxation time of end-capped CH<sub>3</sub> of alkyl ammonium grafted onto layer surface via ion exchanging in the solution shows that the layer spacing was increased significantly or even exfoliated. When the solution was blended with some polar polymers, exfoliated **nanocomposites** were found. When it was blended with some nonpolar polymers, however, intercalated **nanocomposites** were obtained. The reason was explained in the light of compatibility between polymer matrix and MMT as well as alkyl ammonium and PDMS grafted on the layer surface. For intercalated **nanocomposites**, different layer spacing corresponds to different chain flexibility and the presence of multi-peaks is caused by the processing of these blends.  
ST polydimethylsiloxane alkylammonium modified **montmorillonite**  
polymer **nanocomposite**  
IT Exfoliation  
Intercalation  
(in polymer/**montmorillonite nanocomposites**)  
IT EPDM **rubber**  
Polycarbonates, properties  
**Styrene-butadiene rubber**, properties  
RL: POF (**Polymer in formulation**); PRP (**Properties**); USES (**Uses**)  
(matrix; new approach to polymer/**montmorillonite nanocomposites**)  
IT Nanocomposites  
(new approach to polymer/**montmorillonite nanocomposites**)  
IT Polysiloxanes, preparation  
RL: MOA (**Modifier or additive use**); POF (**Polymer in formulation**)  
; PRP (**Properties**); SPN (**Synthetic preparation**); PREP (**Preparation**); USES (**Uses**)  
(new approach to polymer/**montmorillonite nanocomposites**)  
IT Crystal structure  
Microstructure  
Thermal stability

(of polymer/**montmorillonite nanocomposites**)  
T Spin-lattice relaxation  
(of treated **montmorillonite for nanocomposites**)  
T 31900-57-9, Poly(dimethylsiloxane)  
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)  
(assumed monomers, matrix; new approach to polymer/  
**montmorillonite nanocomposites**)  
T 9002-86-2, Polyvinyl chloride 9003-53-6, Polystyrene 9016-00-6,  
Poly(dimethylsiloxane)  
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)  
(matrix; new approach to polymer/**montmorillonite**  
**nanocomposites**)  
T 57-09-0DP, Hexadecyltrimethylammonium bromide, reaction products  
with sodium **montmorillonite**, PDMS 1318-93-0DP,  
**Montmorillonite** ((Al1.33-1.67Mg0.33-0.67) (Ca0-1Na0-  
1)0.33Si4(OH)2010.xH2O), sodium-exchanged, hexadecyltrimethylammonium  
bromide modified, reaction products with PDMS 9016-00-6DP,  
Poly[oxy(dimethylsilylene)], reaction products with  
hexadecyltrimethylammonium bromide modified **montmorillonite**  
158158-00-0DP, Dichlorodimethylsilane hydrolytic homopolymer, reaction  
products with hexadecyltrimethylammonium bromide modified  
**montmorillonite**  
RL: MOA (Modifier or additive use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)  
(new approach to polymer/**montmorillonite**  
**nanocomposites**)  
9003-55-8  
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)  
(**styrene-butadiene rubber**, matrix; new  
approach to polymer/**montmorillonite nanocomposites**)  
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L75 ANSWER 17 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 4  
AN 2003:915362 HCPLUS  
DN 140:95381  
ED Entered STN: 24 Nov 2003  
TI Synthesis and characterization of poly(urethane-benz oxazine)/**clay**  
hybrid **nanocomposites**  
AU Takeichi, Tsutomu; Guo, Yong  
CS School of Materials Science, Toyohashi University of Technology,  
Toyohashi, 441-8580, Japan  
SO Journal of Applied Polymer Science (2003), 90(14), 4075-4083  
CODEN: JAPNAB; ISSN: 0021-8995  
PB John Wiley & Sons, Inc.  
DT Journal  
LA English  
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)  
Section cross-reference(s): 37, 73  
AB Poly(urethane-benz oxazine)/**clay** hybrid **nanocomposites**  
(PU/Pa-OMMT) were prepared from an in situ copolymer of a polyurethane (PU)  
prepolymer and a monofunctional benz oxazine monomer, 3-phenyl-3,4-dihydro-  
2H-1,3-benz oxazine (Pa), in the presence of an organophilic  
**montmorillonite** (OMMT), by solvent method using DMAc. OMMT was  
made from cation-exchange of Na-**montmorillonite** with  
dodecyl ammonium chloride. The formation of the exfoliated  
**nanocomposites** structures of PU/Pa-OMMT was confirmed by XRD from  
the disappearance on the peak due to the basal diffraction of the  
layer-structured **clay** found in OMMT. DSC showed that, in the  
presence of OMMT, the curing temperature of PU/Pa lowered by ca. 60°C for  
the onset and ca. 20°C for the maximum. After curing at 190°C  
for 1 h, the exothermic peak on DSC disappeared. All the obtained films  
of PU/Pa-OMMT were deep yellow and transparent. As the content of OMMT  
increased, both the tensile modulus and strength of PU/Pa-OMMT films  
increased, while the elongation decreased. The characteristics of the  
PU/Pa-OMMT films changed from plastics to **elastomers** depending  
on OMMT content and PU/Pa ratio. PU/Pa-OMMT films also exhibited  
excellent resistance to the solvents such as THF, N,N-dimethylformamide  
and N-methyl-2-pyrrolidinone. The thermal stability of PU/Pa were  
enhanced remarkably even with small amount of OMMT.  
ST polyurethane benzoxazine **rubber** organo **clay**  
**nanocomposite** viscoelasticity elastic strength  
IT Urethane **rubber**, properties  
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)  
(benzoxazine-based; poly(urethane-benzoxazine) **clay** hybrid  
**nanocomposites**)  
IT Crosslinking  
(effect of organophilic modified **clay** on curing of  
poly(urethane-benzoxazine))  
IT Reinforced plastics  
RL: PRP (Properties)

(effect of organophilic modified **clay** on decomposition temperature of poly(urethane-benzoxazine))

IT **Clays, uses**

RL: MOA (Modifier or additive use); USES (Uses)  
(montmorillonitic; poly(urethane-benzoxazine) **clay** hybrid  
**nanocomposites**)

IT Solubility

(organic solvents; poly(urethane-benzoxazine) **clay** hybrid  
**nanocomposites**)

IT Elongation at break

Glass transition temperature

Hybrid organic-inorganic materials

**Nanocomposites**

Optical absorption

Solvent-resistant materials

Storage modulus

Stress-strain relationship

Tensile strength

Young's modulus

(poly(urethane-benzoxazine) **clay** hybrid  
**nanocomposites**)

IT Synthetic **rubber**, properties

RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)  
(polyurethane-, benzoxazine-based; poly(urethane-benzoxazine)  
**clay** hybrid **nanocomposites**)

IT Polymer degradation

(thermal; effect of organophilic modified **clay** on decomposition  
temperature of poly(urethane-benzoxazine))

IT 929-73-7D, Dodecyl ammonium chloride, **cation**-exchange reaction  
product with Kunipia F 187247-40-1D, Kunipia F, **cation**  
-exchange reaction product with dodecyl ammonium chloride

RL: MOA (Modifier or additive use); USES (Uses)  
(filler; poly(urethane-benzoxazine) **clay** hybrid  
**nanocomposites**)

IT 350809-92-6

RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)  
(rubber; poly(urethane-benzoxazine) **clay** hybrid  
**nanocomposites**)

IT 67-66-3, Chloroform, uses 67-68-5, Dimethylsulfoxide, uses 68-12-2,  
Dimethylformamide, uses 109-99-9, uses 120-94-5, N-Methyl pyrrolidine  
127-19-5, N,N-Dimethylacetamide

RL: NUU (Other use, unclassified); USES (Uses)  
(solvent; solvent resistance of poly(urethane-benzoxazine) **clay**  
**hybrid nanocomposites**)

RE.CNT 38 THERE ARE 38 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L75 ANSWER 18 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 5

AN 2003:421630 HCPLUS

DN 139:198654

ED Entered STN: 03 Jun 2003

TI Melt compounded epoxidized natural **rubber**/layered silicate  
**nanocomposites**: structure-properties relationships

AU Varghese, S.; Karger-Kocsis, J.; Gatos, K. G.

CS Institute for Composite Materials, Department of Materials Science,  
Kaiserslautern University of Technology, Kaiserslautern, D-67663, Germany

SO Polymer (2003), 44(14), 3977-3983

CODEN: POLMAG; ISSN: 0032-3861

PB Elsevier Science Ltd.

DT Journal

LA English

CC 39-12 (Synthetic Elastomers and Natural **Rubber**)

AB Epoxidized natural **rubber** (ENR)-layered silicate composites were produced by melt compounding and sulfur curing. Pristine (sodium **bentonite** and sodium fluorohectorite) and organophilic modified silicates (organoclays with primary amine and **quaternary** ammonium modifications) were introduced in 10 parts per hundred **rubber** (phr) in the recipes and their effect on the curing and (thermo)mech. properties determined. The dispersion state of the silicates was studied by X-ray diffraction and transmission electron microscopy. Fastest curing and best mech. properties were found for the ENR containing the organoclay with primary amine modification. This organoclay was partly exfoliated, partly intercalated and partly confined (reaggregated). Due to the high shearing during compounding the pristine fluorohectorite was also intercalated by ENR. The complex dispersion state of the layered silicates was well reflected in the glass transition relaxation, which showed multiple peaks. Intercalation/exfoliation of the silicates were best displayed in stiffness- and strength-related mech. parameters.

ST epoxidized natural **rubber** layered silicate **nanocomposite**  
structure property relationship  
IT Natural **rubber**, properties  
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)  
(epoxidized; structure-properties relationships of melt compounded  
epoxidized natural **rubber**/layered silicate  
**nanocomposites**)  
IT **Bentonite**, properties  
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)  
(sodian; structure-properties relationships of melt compounded  
epoxidized natural **rubber**/layered silicate  
**nanocomposites**)  
IT Elongation, mechanical  
Hardness (mechanical)  
Mechanical loss  
Mechanical properties  
Molecular structure-property relationship  
**Nanocomposites**  
Storage modulus  
Tensile strength  
(structure-properties relationships of melt compounded epoxidized  
natural **rubber**/layered silicate **nanocomposites**)  
IT Strength  
(tearing; structure-properties relationships of melt compounded  
epoxidized natural **rubber**/layered silicate  
**nanocomposites**)  
IT 182636-27-7, Somasif ME100 309295-00-9, Cloisite 30B 402944-35-8,  
**Nanomer** I.30P  
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)  
(structure-properties relationships of melt compounded epoxidized  
natural **rubber**/layered silicate **nanocomposites**)

RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L75 ANSWER 19 OF 59 COMPENDEX COPYRIGHT 2004 EEI on STN

AN 2003(45):8938 COMPENDEX

TI Preparation, Characterization, and **Nanostructural** Evolution of  
Epoxy **Nanocomposites**.

AU Chen, Chenggang (Univ. of Dayton Research Institute, Dayton, OH

SO 45469-0168, United States); Curliss, David  
Journal of Applied Polymer Science v 90 n 8 Nov 21 2003 2003.p 2276-2287  
CODEN: JAPNAB ISSN: 0021-8995  
PY 2003  
DT Journal  
TC Experimental  
LA English  
AB Epoxy **nanocomposites** were prepared from the different organoclays with aerospace epoxy resin. A series of organoclays treated with alkylammonium chloride with different alkyl groups of different carbon chains were prepared, including SC4, SC6, SC8, SC10, SC12, SC16, SC18, and NC8, NC12, NC18. All of these organoclays, except for SC4, are very compatible with the aerospace Epon 862/ curing agent W. The characterization from wide-angle X-ray diffraction (WAXD), small-angle X-ray scattering (SAXS), and transmission electron microscopy (TEM) confirms the exfoliated **nanostructure**. The six-carbon chain length of the ammonium **cation** is enough to wet the surface of the **clay** gallery to make the organoclay compatible with epoxy resin. The **clay** with lower **cation** exchange capacity is more favorable for the polymer penetration inside the gallery and is dispersed better in the polymer matrix. The structural evolution of the aerospace epoxy **nanocomposite** was monitored by in situ SAXS. The 3% SC18/Epon 862/W, 3 and 6% SC8/Epon 862/W showed exfoliated **nanostructure**, while there is no exfoliation taking place for 3% S30B/Epon 862/W and 3% S25A/Epon 862/W up to 200deg C. The acidity from the pendent group in SC18 and SC8 has a catalytic effect for the polymerization inside the gallery, while the organic pendent group of S30B and S25A does not. The faster reaction of the intragallery epoxy resin produced extra thermal heat inside the gallery to expand the gallery and is favorable for the migration of epoxy resin outside the gallery into the gallery where exfoliation took place. The exothermal heat of curing inside the gallery is an important factor for **nanosheets** exfoliation. Although exfoliation took place for both 3% SC18/Epon 862/W and 3% SC8/Epon 862/W, the detailed morphology development during the curing is different. For 3% SC8/Epon 862/W, the interplanar spacing between the layers is increased gradually, while 3% SC18/Epon 862/W experienced the disappearance of the ordered structure of the layered silicate in the beginning of the curing process and reappearance of the ordered structure of the silicate later. The glassy and **rubbery** moduli of the polymer-silicate **nanocomposites** were found to be greater than the unmodified resin because of the high aspect ratio and high stiffness of the layered silicate filler. \$CPY 2003 Wiley Periodicals, Inc. 30 Refs. 815.1.1 Organic Polymers; 933.1 Crystalline Solids; 483.1 Soils and Soil Mechanics; 931.2 Physical Properties of Gases, Liquids and Solids; 421 Strength of Building Materials. Mechanical Properties  
CC CT \*Epoxy resins; **Nanostructured** materials; Stiffness; **Clay**; Morphology  
ST ET **Cation** exchange capacity  
W; B\*S; S30B; S cp; cp; B cp  
  
L75 ANSWER 20 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN  
AN 2004:103488 HCPLUS  
ED Entered STN: 09 Feb 2004  
TI **Rubber nanocomposites** via solution and melt intercalation  
AU Varghese, Siby; Karger-Kocsis, J.; Pannikottu, Abraham  
CS Rubber Research Institute of India, Kerala, India  
SO Technical Papers - American Chemical Society, Rubber Division, [Fall

Technical Program], 164th, Cleveland, OH, United States, Oct. 14-17, 2003 (2003), 2148-2172 Publisher: American Chemical Society, Rubber Division, Akron, Ohio.

CODEN: 69EZYK; ISSN: 1547-1969

DT Conference; (computer optical disk)

LA English

CC 39 (Synthetic Elastomers and Natural **Rubber**)

AB A brief review was given on the production and structure/property relationships in **rubbers** reinforced by layered silicates.

Natural **rubber** (NR) based **nanocomposites** from **latex** with 10-wt% natural (sodium **bentonite**) and synthetic (sodium fluorohectorite) layered silicate were produced by compounding the dispersions of **clays** and other **latex** chems. necessary for vulcanisation. The solid epoxidised natural **rubber** (ENR-50) layered silicate **nanocomposite** was prepared by melt compounding followed by accelerated sulfur curing. For these sodium **bentonite** and sodium fluorohectorite and organoclays with primary and **quaternary** amine modifications were selected. In the case of **nanocomposites** from NR **latex**, layered silicates recorded the maximum properties compared to the reference material (English India **clay**) in all aspects. This was attributed to the intercalation/exfoliation of the silicates and to the formation of a skeleton (house of cards) silicate network in the NR matrix. Fastest curing and best mech. properties were found for the ENR containing the organoclay with primary amine modification. This organoclay was partly exfoliated, partly intercalated and partly confined (reaggregated). The dispersion state of the silicates was studied by X-ray diffraction and transmission electron microscopy.

Intercalation/exfoliation of the silicates were best displayed in stiffness and strength related mech. parameters. Based on the present findings some tendencies for the future were deduced and discussed.

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L75 ANSWER 21 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN  
AN 2003:684328 HCAPLUS  
DN 139:308729  
ED Entered STN: 02 Sep 2003  
TI Structure and thermoelastic behavior of synthetic **rubber**  
/organoclay **nanocomposites**  
AU Privalko, Valery P.; Ponomarenko, Sergiy M.; Privalko, Eleonora G.;  
Schoen, Frank; Gronski, Wolfram; Staneva, Rosina; Stuehn, Bernd  
CS Institute of Macromolecular Chemistry, National Academy of Sciences of  
Ukraine, Kiev, 02160, Ukraine  
SO Macromolecular Chemistry and Physics (2003), 204(12), 1480-1485  
CODEN: MCHPES; ISSN: 1022-1352  
PB Wiley-VCH Verlag GmbH & Co. KGaA  
DT Journal  
LA English  
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)  
Section cross-reference(s): 37  
AB **Nanocomposites** of synthetic styrene-co-butadiene **rubber**  
and three types of organoclay fillers were prepared by melt-compounding and  
characterized by small-angle X-ray scattering (SAXS), differential  
calorimetry and stretching calorimetry. The in-**rubber** structure  
of the organoclay **particles** is characterized by different  
degrees of intercalation with interlayer distances ranging from 3.1-4.8  
nm. In contrast to the pristine **rubber**, all  
**nanocomposites** exhibited irreversibility of both mech. work and  
heat effects in stretching/contraction cycles at fairly low elongations.  
Moreover, at the same filler loading both the mech. reinforcement effect  
and the magnitude of sp. heat effects proved strongly dependent on the  
degree of intercalation. In the range of low elongations, significantly  
earlier onsets of the heat inversion phenomenon (compared to theor.  
expected), as well as the overshoots of exothermal heat effects in  
contraction above the endothermal heat effects in stretching for  
**nanocomposites**, suggested the contribution of structural  
rearrangements at the **rubber**/filler interface by the mechanism  
of chain slippage operative in both stretching and contraction regimes.  
In the range of high elongations, the thermoelastic behavior of  
**nanocomposites** could be accounted for quant. by the model, which  
assumed explicitly the contributions of local strain amplification for the  
**rubber** matrix and of successive decay of **nanoparticle**  
clusters with increasing strain, generating the exothermal effects of  
external friction between **nanoparticles**.  
ST **styrene butadiene rubber** organoclay  
**nanocomposite** thermoelastic property  
IT **Clays**, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(**cation**-modified; structure and thermoelastic behavior of  
synthetic **rubber**/organoclay **nanocomposites**)  
IT Thermal expansion  
(coefficient; of synthetic **rubber**/organoclay  
**nanocomposites**)  
IT Crystal structure  
Heat capacity  
Young's modulus  
(of synthetic **rubber**/organoclay **nanocomposites**)  
IT Elongation, mechanical  
Simulation and Modeling, physicochemical

(of thermoelastic behavior of synthetic **rubber**/organoclay  
**nanocomposites**)  
IT Work (mechanical)  
(specific; of synthetic **rubber**/organoclay  
**nanocomposites**)  
IT **Nanocomposites**  
(structure and thermoelastic behavior of synthetic **rubber**  
/organoclay **nanocomposites**)  
IT **Styrene-butadiene rubber, properties**  
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)  
(structure and thermoelastic behavior of synthetic **rubber**  
/organoclay **nanocomposites**)  
IT 483297-86-5, **Nanomer I 42E**  
RL: MOA (Modifier or additive use); USES (Uses)  
(**Nanofil**; structure and thermoelastic behavior of synthetic  
**rubber**/organoclay **nanocomposites**)  
IT 612491-65-3D, protonated, reaction products with **clay**  
RL: MOA (Modifier or additive use); USES (Uses)  
(structure and thermoelastic behavior of synthetic **rubber**  
/organoclay **nanocomposites**)  
IT **9003-55-8**  
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)  
(**styrene-butadiene rubber**, structure and  
thermoelastic behavior of synthetic **rubber**/organoclay  
**nanocomposites**)

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L75 ANSWER 22 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 2003:572041 HCPLUS

DN 139:338906

ED Entered STN: 27 Jul 2003

TI Structure and properties of natural **rubber** and modified  
**montmorillonite nanocomposites**

AU Magaraphan, Rathanawan; Thajaroen, Woothichai; Lim-Ochakun, Ratree  
CS The Petroleum and Petrochemical College, Chulalongkorn University,  
Bangkok, 10330, Thailand  
SO Rubber Chemistry and Technology (2003), 76(2), 406-418  
CODEN: RCTEA4; ISSN: 0035-9475  
PB American Chemical Society, Rubber Division  
DT Journal  
LA English  
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)  
Section cross-reference(s): 37  
AB **Montmorillonite clay** was organically modified by primary and **quaternary** ammonium salts (having C12-C18). The modified **clay** was added to a solution of natural **rubber** in toluene at various contents. Characterization of the structure of the **nanocomposites** was performed by using x-ray diffraction and transmission electron microscope. The results showed that the silicate layers of the **clay** were expanded so that the exfoliated **nanocomposites** were obtained at **clay** content below 10 weight% above that the **nanocomposites** became partially exfoliated. Moreover, long primary amine showed more improved mech. properties than the **quaternary** one (at the same carbon nos.). The longer organic modifying agents resulted in better expansion of silicate layer distance indicating more intercalation of natural **rubber** mols. in between **clay** galleries. The curing properties were also improved. It was found that a small loading of 7 weight% is enough to bring good mech. properties in comparison to those of high structure silica filled and carbon black filled natural **rubber** vulcanizates.  
ST natural **rubber montmorillonite** alkylamine ion exchange  
IT **nanocomposite** tensile strength  
Natural **rubber**, properties  
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)  
(STR 5L; natural **rubber** and modified **montmorillonite nanocomposites**)  
IT Polymer morphology  
(micromorphol.; mol. intercalation for organically modified **montmorillonite** of natural **rubber nanocomposites**)  
IT Intercalation  
(mol. intercalation for organically modified **montmorillonite** of natural **rubber nanocomposites**)  
IT Clays, preparation  
RL: MOA (Modifier or additive use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(montmorillonitic, fillers; natural **rubber** and organically modified **montmorillonite nanocomposites**)  
IT Nanocomposites  
(natural **rubber** and modified **montmorillonite nanocomposites**)  
IT Elongation at break  
Fillers  
Hardness (mechanical)  
Ion exchange  
Tensile strength  
Vulcanization  
Young's modulus  
(natural **rubber** and organically modified **montmorillonite nanocomposites**)  
IT Reinforced plastics

RL: PRP (Properties)

(natural **rubber** and organically modified  
**montmorillonite nanocomposites**)

IT 57-09-0DP, Hexadecyltrimethyl ammonium bromide, reaction product with sodium exchanged **montmorillonite** 112-03-8DP, Octadecyltrimethyl ammonium chloride, reaction product with sodium exchanged **montmorillonite** 124-22-1DP, Dodecylamine, reaction product with sodium exchanged **montmorillonite** 124-30-1DP, Octadecylamine, reaction product with sodium exchanged **montmorillonite** 143-27-1DP, Hexadecylamine, reaction product with sodium exchanged **montmorillonite** 1318-93-0DP, **Montmorillonite**, sodium exchanged, reaction products with alkylamine 2016-42-4DP, Tetradecylamine, reaction product with sodium exchanged **montmorillonite**  
RL: MOA (Modifier or additive use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(filler; natural **rubber** and organically modified  
**montmorillonite nanocomposites**)

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L75 ANSWER 23 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 2003:234204 HCPLUS

DN 139:23124

ED Entered STN: 26 Mar 2003

TI Effect of organomontmorillonite modified with different intercalants on properties of EPDM/**clay nanocomposites**

AU Zheng, Hua; Zhang, Yinxi; Zhang, Yong; Peng, Zonglin

CS Research Institute of Polymer Materials, Shanghai Jiaotong University, Shanghai, 200240, Peop. Rep. China

SO Hecheng Xiangjiao Gongye (2003), 26(2), 115

CODEN: HXGOEA; ISSN: 1000-1255

PB Hecheng Xiangjiao Gongye Zazhi Bianjibu  
DT Journal  
LA English  
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)  
Section cross-reference(s): 46, 57  
AB The effect of organomontmorillonite (OMMT) modified with three intercalants: octadecyl tri-Me ammonium chloride (DK1), bis(2-hydroxyethyl) Me dodecyl ammonium chloride (DK2) and octadecyl di-Me benzylammonium chloride (DK5) on the mech. properties and the dynamic mech. properties of the EPDM/OMMT **nano** composites were studied. Among the blends with the three OMMT, the EPDM/DK2 had the best properties. This may be caused by the interaction between the hydroxyethyl of DK2 and the oxygen of the OMMT.  
ST EPDM **rubber** organomontmorillonite **nanocomposite**  
surfactant modified  
IT Surfactants  
(**cationic**; effect of organomontmorillonite modified with surface active intercalants on properties of EPDM/**clay**  
**nanocomposites**)  
IT Elongation at break  
**Nanocomposites**  
Polymer morphology  
Storage modulus  
Tensile strength  
(effect of organomontmorillonite modified with surface active intercalants on properties of EPDM/**clay**  
**nanocomposites**)  
IT EPDM **rubber**  
RL: POF (**Polymer in formulation**); PRP (**Properties**); USES (**Uses**)  
(effect of organomontmorillonite modified with surface active intercalants on properties of EPDM/**clay**  
**nanocomposites**)  
IT Clays, properties  
RL: MOA (**Modifier or additive use**); PRP (**Properties**); USES (**Uses**)  
(montmorillonitic; effect of organomontmorillonite modified with surface active intercalants on properties of EPDM/**clay**  
**nanocomposites**)  
IT Complex modulus  
(tan  $\delta$ ; effect of organomontmorillonite modified with surface active intercalants on properties of EPDM/**clay**  
**nanocomposites**)  
IT Strength  
(tearing; effect of organomontmorillonite modified with surface active intercalants on properties of EPDM/**clay**  
**nanocomposites**)  
IT 112-03-8, Octadecyl trimethyl ammonium chloride 122-19-0, Octadecyl dimethyl benzylammonium chloride 22340-01-8, Bis(2-hydroxyethyl) methyl dodecyl ammonium chloride  
RL: MOA (**Modifier or additive use**); USES (**Uses**)  
(**cationic** surfactant; effect of organomontmorillonite modified with surface active intercalants on properties of EPDM/  
**clay nanocomposites**)  
RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE  
(1) Masaga, K; Macromolecules 1997, V30, P6333  
(2) Young, W; Polym Int 2002, V51, P319

AN 2003:353509 HCPLUS  
DN 140:112056  
ED Entered STN: 09 May 2003  
TI Mechanical properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**  
AU Zhan, Mao-sheng; Xiao, Wei; Li, Zhi  
CS School of Materials Sciences and Engineering, Beijing University of Aeronautics and Astronautics, Beijing, 100083, Peop. Rep. China  
SO Hangkong Cailiao Xuebao (2003), 23(1), 34-43  
PB CODEN: HCXUFZ; ISSN: 1005-5053  
DT Hangkong Cailiao Xuebao Bianjibu  
LA Journal  
CC Chinese  
37-5 (Plastics Manufacture and Processing)  
Section cross-reference(s): **39**  
AB Three kinds of montmorillonites (MMT, including S-MMT, TG-2, OLS) and one kind of short-cut glass fiber (SGF) were used to melt compounded with phenolic resin (PF), thus phenolic resin matrix composites were prepared. Notch impacting and bending tests were used to study the mech. properties and strengthening and toughening mechanism, through which some regular results were achieved. Notch impact strength, bending modulus and strength of PF/NBR/SGF composites increase with the increase of the content of SGF. For PF/NBR matrix **montmorillonite nanocomposites**, notch impact strength increase with the increase of the contents of the montmorillonites, when the content of montmorillonites reaches 5 phr, the impact strength is the highest; and the bending modulus and bending strength also increase with the increases of the contents of the montmorillonites, and when the content is up to 9 phr, the bending modulus and bending strength are the highest. Through the comparison of the mech. properties of the PF/NBR matrix composites, it showed that: when the content of the fillers and the exptl. temperature is the same, the notch impact strength of PF/NBR/SGF composite is the highest, but the bending modulus and bending strength are the lowest; the notch impact strength of PF/NBR/OLS **nanocomposites** is the second one, but their bending modulus and bending strength are the highest; the notch impact strength of PF/NBR/TG-2 **nanocomposites** is the third one, and their bending strength and bending modulus are the second one; the notch impact strength of PF/NBR/S-MMT **nanocomposites** is the lowest, and the bending modulus and bending strength is the third one. Secondly, for each of the PF/NBR matrix composites, when the exptl. temperature is 60°C, their impact strength are the highest; when exptl. temperature is higher or lower than 60°C, their impact strength lowered. For PF/NBR/OLS, PF/NBR/TG-2 and PF/NBR/S-MMT **nanocomposites**, their mech. properties have close relation with the space distances of montmorillonites, the greater the space distances of montmorillonites are, the better the mech. properties world be. When the content of **montmorillonite** is the same, the mech. properties of the exfoliated **nanocomposites** are better than intercalated **nanocomposite**. At last, **montmorillonite**'s toughening and strengthening mechanism was studied, and models illustrated in Fig. 10 and Fig. 11 are proposed.  
ST phenolic resin NBR **rubber** glass fiber **montmorillonite nanocomposite**; mech property phenolic resin NBR **rubber nanocomposite**  
IT Exfoliation  
Intercalation  
(effect on mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)

IT Reinforced plastics  
RL: PRP (Properties)  
(glass fiber-reinforced; mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)

IT Bending strength  
Flexural modulus  
Impact strength  
**Nanocomposites**  
Storage modulus  
Vulcanization  
(mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)

IT Nitrile **rubber**, properties  
Phenolic resins, properties  
RL: POF (**Polymer in formulation**); PRP (Properties); USES (Uses)  
(mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)

IT Glass fibers, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(short-cut, surface modified with KH-550; mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)

IT Complex modulus  
(tan  $\delta$ ; mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)

IT 1318-93-0, **Montmorillonite**, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(S-MMT; mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)

IT 57-09-0D, Hexadecyltrimethylammonium bromide, reaction products with **montmorillonite** 919-30-2D, KH 550, reaction products with short-cut glass fiber 647030-37-3, TG 2 647030-38-4, OLS  
RL: MOA (Modifier or additive use); USES (Uses)  
(mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)

IT 647029-71-8, PF 8001  
RL: POF (**Polymer in formulation**); PRP (Properties); USES (Uses)  
(mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)

IT 9003-18-3  
RL: POF (**Polymer in formulation**); PRP (Properties); USES (Uses)  
(nitrile **rubber**, mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)

L75 ANSWER 25 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN  
AN 2002:384386 HCPLUS  
DN 136:370868  
ED Entered STN: 23 May 2002  
TI Polymer **nanocomposite** materials and their production method  
IN Kuo, Wen-Fa; Wu, Chen-Yu; Li, Mao-Sung; Li, Shih-Yang  
PA Industrial Technology Research Institute, Taiwan  
SO Jpn. Kokai Tokkyo Koho, 13 pp.  
CODEN: JKXXAF  
DT Patent  
LA Japanese  
IC ICM C08L101-00

CC ICS B82B001-00; C08J003-215; C08K003-00; C08L101-00; C08L039-00

38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 39

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002146211	A2	20020522	JP 2001-160624	20010529
	US 2002086932	A1	20020704	US 2001-859394	20010518
	US 6710111	B2	20040323		
PRAI	TW 2000-89122542	A	20001026		

AB Title materials comprise polymer matrix 60-99, layered inorg. materials which cover the polymer matrix homogeneously 0.5-30, and polyelectrolytes with charges opposite to the inorg. materials adsorbed on the inorg. materials 0.5-30%. Thus, 100 g **water** dispersion solution containing 0.40 g Kunipia F and 0.37 g poly(diallyldimethylammonium chloride) was added in 50 g 2.35% **styrene-butadiene latex** solution and centrifuged to give a **clay/polyelectrolyte/SBR nanocomposite** with interlayer distance 22.07 Å and peak intensity 2.39 kcps at 4.00° (2θ).

ST **nanocomposite clay** polyelectrolyte **styrene butadiene rubber** prepn

IT Polyelectrolytes

IT (cationic; preparation of **nanocomposite** materials comprising)

IT Mica-group minerals, uses

IT RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

IT (fluorine-rich; preparation of **nanocomposite** materials comprising)

IT **Clay** minerals

IT RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

IT (layered; preparation of **nanocomposite** materials comprising)

IT **Nanocomposites**

IT (preparation of **nanocomposite** materials)

IT Polyelectrolytes

IT (preparation of **nanocomposite** materials comprising)

IT Butadiene **rubber**, uses

IT Isoprene **rubber**, uses

IT Natural **rubber**, uses

IT Nitrile **rubber**, uses

IT Polyurethanes, uses

IT **Styrene-butadiene rubber**, uses

IT RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

IT (preparation of **nanocomposite** materials comprising)

IT **Clays**, uses

IT RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

IT (smectitic; preparation of **nanocomposite** materials comprising)

T 9003-17-2

T RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

T (butadiene **rubber**, preparation of **nanocomposite**

IT materials comprising)  
9003-31-0  
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(isoprene **rubber**, preparation of **nanocomposite** materials comprising)  
9003-18-3  
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(nitrile **rubber**, preparation of **nanocomposite** materials comprising)  
25232-41-1, Poly(4-vinylpyridine) 26062-79-3,  
Poly(diallyldimethylammonium chloride)  
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(polyelectrolyte; preparation of **nanocomposite** materials comprising)  
1318-00-9, Vermiculite **1318-93-0**, Montmorillonite,  
uses 1319-41-1, Saponite 12068-50-7, Halloysite **12172-85-9**,  
**Beidellite 12173-47-6**, **Hectorite** 12174-06-0,  
Nontronite 12174-53-7, Sericite 12417-86-6, Stevensite 187247-40-1,  
Kunipia F  
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(preparation of **nanocomposite** materials comprising)  
9002-86-2, PVC 9003-53-6, Polystyrene 9011-14-7, Methyl methacrylate homopolymer  
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(preparation of **nanocomposite** materials comprising)  
**9003-55-8**  
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(**styrene-butadiene rubber**, preparation of  
**nanocomposite** materials comprising)

L75 ANSWER 26 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN  
AN 2003:980379 HCPLUS  
DN 140:5762  
ED Entered STN: 17 Dec 2003  
TI Phenolic resin/**clay nanocomposite** and its preparation  
IN Zhao, Tong; Zhi, Linjie; Wang, Hongsheng; Yang, Mingshu  
PA Institute of Chemistry, Chinese Academy of Sciences, Peop. Rep. China  
SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 9 pp.  
CODEN: CNXXEV  
DT Patent  
LA Chinese  
IC ICM C08L061-06  
ICS C08K007-00  
CC 38-3 (Plastics Fabrication and Uses)  
Section cross-reference(s): 39  
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1361201	A	20020731	CN 2000-136178	20001227
	CN 1117814	B	20030813		
PRAI	CN 2000-136178		20001227		
AB	<p>A phenolic resin/<b>clay nanocomposite</b>, in which the <b>clay</b> can be peeled off, is obtained by first dispersing <b>clay</b>, such as <b>montmorillonite</b>, into monomers of a thermoplastic phenolic resin, and then polymerizing the monomers in the presence of an acidic catalyst, such as toluene sulfonic acid; the above <b>nanocomposite</b> can be further mixed with resin or <b>rubber</b>, such as epoxy resin, phenolic resin, PE, PET, PMMA, butadiene-styrene <b>rubber</b>, and ethylene-propylene <b>rubber</b>. Thus, <b>cation-exchanged montmorillonite</b>, phenol, formaldehyde were mixed to receive a colloid system, followed by addition of oxalic acid and polymerizing at 95° for 4 h to receive a phenolic resin/<b>clay nanocomposite</b>, which could be further mixed with polyethylene.</p>				
ST	phenol formaldehyde copolymer phenolic resin polyethylene <b>clay montmorillonite nanocomposite</b>				
IT	Silicates, uses				
	RL: MOA (Modifier or additive use); USES (Uses) (layered, <b>nanocomposite</b> ; phenolic resin/ <b>clay nanocomposite</b> and its preparation)				
IT	Epoxy resins, uses Ethylene-propylene <b>rubber</b> Phenolic resins, uses Polyamides, uses Polyesters, uses <b>Styrene-butadiene rubber</b> , uses				
	RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses) ( <b>nanocomposite</b> ; phenolic resin/ <b>clay nanocomposite</b> and its preparation)				
IT	<b>Nanocomposites</b> (phenolic resin/ <b>clay nanocomposite</b> and its preparation)				
IT	<b>Clays</b> , uses RL: MOA (Modifier or additive use); USES (Uses) (phenolic resin/ <b>clay nanocomposite</b> and its preparation)				
IT	9010-79-1 RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses) (ethylene-propylene <b>rubber</b> , <b>nanocomposite</b> ; phenolic resin/ <b>clay nanocomposite</b> and its preparation)				
IT	9003-35-4P, Formaldehyde-phenol copolymer RL: CPS (Chemical process); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses) ( <b>nanocomposite</b> ; phenolic resin/ <b>clay nanocomposite</b> and its preparation)				
IT	1318-93-0, <b>Montmorillonite</b> , uses RL: MOA (Modifier or additive use); USES (Uses) ( <b>nanocomposite</b> ; phenolic resin/ <b>clay nanocomposite</b> and its preparation)				
IT	9002-86-2, Poly(vinyl chloride) 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-53-6, Polystyrene 9011-14-7, Poly(methyl methacrylate) 25014-41-9, Polyacrylonitrile 25038-54-4, Nylon 6, uses 25038-59-9, PET polymer, uses 32131-17-2, Nylon 66, uses				

RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)

(**nanocomposite**; phenolic resin/**clay**  
**nanocomposite** and its preparation)

IT 104-15-4, Toluene sulfonic acid, uses 144-62-7, Oxalic acid, uses  
7647-01-0, Hydrochloric acid, uses 13598-36-2, Phosphonic acid

RL: CAT (Catalyst use); USES (Uses)

(phenolic resin/**clay nanocomposite** and its preparation)

IT 108066-37-1, Epoxy 618

RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)

(phenolic resin/**clay nanocomposite** and its preparation)

IT 9003-55-8

RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)

(**styrene-butadiene rubber**,  
**nanocomposite**; phenolic resin/**clay**  
**nanocomposite** and its preparation)

L75 ANSWER 27 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 2003:730587 HCPLUS

ON 139:215273

ED Entered STN: 18 Sep 2003

TI **Nanoscale** composite materials containing layered inorganic  
**clays** and polyelectrolytes and a method for preparation thereof

IN Guo, Wenfa; Wu, Zhenyu; Li, Maosong; Li, Shiyang

PA Research Institute of Industrial Technology, Consortium, Peop. Rep. China

SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 31 pp.

CODEN: CNXXEV

DT Patent

LA Chinese

IC ICM C08L009-08

ICS C08K003-34

CC 37-6 (Plastics Manufacture and Processing)

Section cross-reference(s): 39

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	---	-----	-----	-----
CN 1357565	A	20020710	CN 2000-134026	20001207
CN 1121442	B	20030917		
PRAI CN 2000-134026		20001207		

AB The composites comprise 60-90% base polymer (A), 0.5-30% layered inorg.

**clays** (B) dispersed in A, and 0.5-30% polyelectrolytes (C) having

opposite elec. charge with B, wherein A is selected from **styrene**

-**butadiene rubber**, **isoprene rubber**,

**butadiene rubber**, **nitrile rubber**, natural

**rubber**, PVC, polystyrene, PMMA, polyurethane or mixture thereof.

Thus, dispersing 5 g **montmorillonite clay** (Kunipia F)

in 100 g **water** and mixing with 2% a **cationic**

polyelectrolyte gave an **aqueous** mixture solution, which was further mixed

with **styrene-butadiene rubber latex**

in a desired ratio, centrifugalized, washed and dried to give a title composite material.

ST **styrene butadiene latex** polyelectrolyte

IT **nanoscale** composite material prep; layered inorg

**montmorillonite clay nanoscale** composite

material prep

Polyelectrolytes

(cationic; in preps. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT **Nanocomposites**  
(containing layered inorg. **clays** and polyelectrolytes and preps. thereof)

IT **Styrene-butadiene rubber, properties**  
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)  
(in preps. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT **Butadiene rubber, properties**  
**Isoprene rubber, properties**  
**Natural rubber, properties**  
**Nitrile rubber, properties**  
**Polyurethanes, properties**  
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)  
(in preps. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT **Clays, uses**  
RL: MOA (Modifier or additive use); USES (Uses)  
(montmorillonitic, layered **clay**; in preps. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT **Clays, uses**  
RL: MOA (Modifier or additive use); USES (Uses)  
(smectitic, layered **clay**; in preps. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT 9003-17-2  
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)  
(butadiene **rubber**, in preps. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT 9002-86-2, PVC 9003-53-6, Polystyrene 9011-14-7, Poly(methyl methacrylate)  
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)  
(in preps. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT 9003-31-0  
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)  
(isoprene **rubber**, in preps. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT 1318-00-9, Vermiculite 1319-41-1, Saponite 12068-50-7, Shinshu Kaolin  
**12172-85-9, Beidellite 12173-47-6,**  
**Hectorite** 12174-06-0, Nontronite 12174-53-7, Sericite  
12417-86-6, Stevensite 187247-40-1, Kunipia F

IT RL: MOA (Modifier or additive use); USES (Uses)  
(layered **clay**; in preps. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT 9003-18-3  
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)  
(nitrile **rubber**, in preps. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT 9003-47-8, Poly(vinylpyridine) 26062-79-3, Poly(diallyldimethylammonium chloride)  
RL: MOA (Modifier or additive use); USES (Uses)  
(polyelectrolyte; in preps. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT 9003-55-8

RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)

(styrene-butadiene rubber, in preps. of composite materials containing layered inorg. clays and polyelectrolytes)

L75 ANSWER 28 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 2003:178248 HCPLUS

DN 138:171582

ED Entered STN: 11 Mar 2003

TI Preparation of layered nanoscale composites from graft silicone rubber and clay

IN Zhou, Ninglin

PA Nanjing Normal Univ., Peop. Rep. China

SO Faming Zhanli Shenqing Gongkai Shuomingshu, 13 pp.

CODEN: CNXXEV

DT Patent

LA Chinese

IC ICM C08L083-04

ICS C08K003-34

CC 39-7 (Synthetic Elastomers and Natural Rubber)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI CN 1336397	A	20020220	CN 2001-127115	20010817
PRAI CN 2001-127115		20010817		

AB The composites have improved mech. properties and oil-resistance and are prepared from grafted silicone rubber 100, clay 0.5-2, cationic surfactant 0.4-2, dispersing medium 20-100, crosslinking agent 1-10, and promoter 0.1-1 parts. Thus, reacting 100 g polydimethylsiloxane-Me methacrylate graft rubber with a mixture of 0.5 g clay dispersed in 20 mL water and containing 0.4 g [3-(triethoxysilyl)propyl]octadecyldimethylammonium chloride for 5 h and adding 6 g Et silicate and 0.5 g dibutyltin dilaurate, and staying at 35° for 18 h gave a layered composite.

ST polydimethylsiloxane methyl methacrylate grafted rubber

clay layered composite prepn; silicone rubber

clay layered nanoscale composite prepn

IT Silicone rubber, properties

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PROC (Process); USES (Uses)

(graft polymers; preparation of layered nanoscale composites from graft silicone rubber and clay)

IT Nanocomposites

(preparation of layered nanoscale composites from graft silicone rubber and clay)

IT Clays, uses

RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(preparation of layered nanoscale composites from graft silicone rubber and clay)

IT Intercalation compounds

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)

(preparation of layered nanoscale composites from graft silicone

IT      **rubber and clay)**  
IT      57-09-0, CTMAB 62117-57-1, Dimethyloctadecyl[3-(triethoxysilyl)propyl]ammonium chloride  
RL: NUU (Other use, unclassified); USES (Uses)  
      (cationic surfactant; preparation of layered **nanoscale** composites from graft silicone **rubber and clay**)  
IT      497826-55-8  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PROC (Process); USES (Uses)  
      (preparation of layered **nanoscale** composites from graft silicone **rubber and clay**)  
IT      161512-62-5, Dimethylsilanediol-methyl methacrylate graft copolymer  
171188-19-5, Butyl acrylate-dimethylsilanediol-methyl methacrylate graft copolymer 497826-56-9  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PROC (Process); USES (Uses)  
      (rubber; preparation of layered **nanoscale** composites from graft silicone **rubber and clay**)  
  
L75     ANSWER 29 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN  
AN      2003-210081 [20]    WPIX  
CR      2003-201329 [19]; 2003-221325 [21]  
DNC     C2003-053466  
TI      **Nanocomposite** for **tire** inner-liner, inner-tube,  
comprises **clay** and halogenated **elastomer** comprising  
iso-olefin derived units and amine-functionalized monomer unit.  
DC      A18 A25 A95  
IN      CHUNG, D Y; DIAS, A J; GONG, C; TSOU, A H; WENG, W  
PA      (ESSO) EXXONMOBIL CHEM PATENTS INC  
CYC     101  
PI      WO 2002100935 A1 20021219 (200320)\* EN 62 C08K003-00  
      RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ  
      NL OA PT SD SE SL SZ TR TZ UG ZM ZW  
      W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK  
      DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR  
      KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT  
      RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM  
      ZW  
      EP 1404749      A1 20040407 (200425) EN C08K003-00  
      R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT  
      RO SE SI TR  
ADT     WO 2002100935 A1 WO 2002-US16796 20020529; EP 1404749 A1 EP 2002-739471  
20020529, WO 2002-US16796 20020529  
FDT     EP 1404749 A1 Based on WO 2002100935  
PRAI    US 2001-297915P      20010613; US 2001-296873P      20010608  
IC      ICM C08K003-00  
AB      WO2002100935 A UPAB: 20040418  
      NOVELTY - **Nanocomposite** comprises a **clay** and a  
halogenated **elastomer** comprising 4-7C iso-olefin derived units  
and amine-functionalized monomer unit.  
      DETAILED DESCRIPTION - A **nanocomposite** comprises a  
**clay** and a halogenated **elastomer** comprising 4-7C  
iso-olefin derived units and an amine-functionalized monomer unit of  
formula R-C(E)(R1)-NR2R3R4 (I).  
      R, R1 = H, 1-7C alkyl, primary or secondary alkyl halide; and  
R2-R4 = H, (un)substituted 1-20C alkyl, alkene or aryl, 1-20C

aliphatic alcohols or ethers, 1-20C carboxylic acids, nitriles, ethoxylated amines, acrylates, ester or ammonium ions.

INDEPENDENT CLAIMS are included for the following:

(1) **tire inner-liner comprising the nanocomposite**

;

(2) inner-tube comprising the **nanocomposite**; and  
(3) method of forming the **nanocomposite** which involves combining **clay** and halogenated **elastomer**.

USE - Useful for air barriers for producing innerliners for motor vehicles, innerliners and innertube for articles such as track **tires**, bus **tires**, passenger automobile, motorcycle **tires**, off the road **tires**.

ADVANTAGE - The **nanocomposite** has improved heat aging resistance. Addition of tertiary amines and polyfunctional curatives improves air permeability of interpolymers.

Dwg.0/0

FS

CPI

FA

AB; GI

MC

CPI: A08-R06B; A10-E04A; A12-T01

L75 ANSWER 30 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2002-698739 [75] WPIX

DNC C2002-197932

TI Preparation of polymer **nanocomposite** used in paints, automobile **tires**, involves mixing polymer dispersion with **clay** mineral dispersion and adding flocculating agent to resulting **clay**-polymer dispersion mixture.

DC A18 A31 E14 E16

IN KNUDSON, M I; POWELL, C E; POWELL, C

PA (KNUD-I) KNUDSON M I; (POWE-I) POWELL C E; (SCLA-N) SOUTHERN CLAY PROD INC

CYC 101

PI WO 2002070589 A2 20020912 (200275)\* EN 19 C08J003-215 <--

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ  
NL OA PT SD SE SL SZ TR TZ UG ZM ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK  
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR  
KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT  
RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG UZ VN YU ZA ZM ZW

US 2002165305 A1 20021107 (200275) C08K003-34 <--

EP 1366109 A2 20031203 (200380) EN C08J003-215 <--

R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT  
RO SE SI TR

ADT WO 2002070589 A2 WO 2002-US6055 20020228; US 2002165305 A1 Provisional US  
2001-273271P 20010302, US 2002-86173 20020228; EP 1366109 A2 EP  
2002-731107 20020228, WO 2002-US6055 20020228

FDT EP 1366109 A2 Based on WO 2002070589

PRAI US 2001-273271P 20010302; US 2002-86173 20020228

IC ICM C08J003-215; C08K003-34

AB WO 200270589 A UPAB: 20030828

NOVELTY - Producing **nanocomposites** by mixing dispersions of polymers and dispersions of **clay** materials and flocculating to give solid material which exhibit characteristics such as exfoliation of the **clay** mineral platelets.

DETAILED DESCRIPTION - A polymer dispersion is mixed with a **clay** mineral dispersion to form a **clay**-polymer dispersion. A flocculating agent is added to the **clay**-polymer dispersion mixture to form a polymer **nanocomposite**.

An INDEPENDENT CLAIM is included for a polymer **nanocomposite**

USE - For production of polymer **nanocomposite** which is mixed with other materials to produce number of different products or articles such as automobile **tires**, used for forming films, fibers, **rubber** composition and paints.

ADVANTAGE - The flocculated solid material exhibits characteristics of **nanocomposite** such as exfoliation of **clay** mineral platelets. The polymer **nanocomposite** is mixed with other materials to produce number of different products or articles such as automobile **tires**. The **nanocomposite** is added to impart improved performance of the automobile **tire** on ice by minimizing reinforcing performance of a tread **rubber** and improving the traction force by elimination of hydroplaning and increasing area of contact with a road surface. The **nanocomposite** imparts favorable characteristics in production of fibers, or with injection or blow molding, and improves the extrusion of the fibers similar to elimination of melt fractures in commercial films. Injection molding process exhibit improvements in form release and more accurate replication of the molded product to the form. Blow molding processes exhibit improved surface structure features. The produced fiber exhibits increased tensile or flexural strength. A **rubber** composition formed with the **nanocomposites** exhibit excellent hydrophobic and **water** repellence characteristics, and paints formulated with the **nanocomposites** has improved paint characteristics such as minimized sagging, luster, durability, thixotropy and solid suspension.

Dwg.0/0

FS

CPI

FA

AB; DCN

MC

CPI: A07-B01; A12-B01A; A12-T01; E05-G; E05-G03A; E10-A01; E10-A22; E10-B04; E31-P02D; E31-P05; E33-B; E33-G; E34-B03; E34-D02

L75 ANSWER 31 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2002-463149 [49] WPIX

CR

2002-425907 [45]; 2002-443974 [47]; 2002-499819 [53]; 2002-500841 [53]; 2002-527351 [56]

DNN

N2002-365184 DNC C2002-131580

TI

Preparation of **aqueous nanocomposite** dispersion used in coatings, sealants, involves polymerizing modified **aqueous clay** dispersion comprising ethylenically unsaturated monomer and exchangeable **cations**.

DC A18 A60 G02 G03 G08 T04

IN LORAH, D P; SLONE, R V

PA (ROHM) ROHM & HAAS CO; (LORA-I) LORAH D P; (SLON-I) SLONE R V

CYC 98

PI WO 2002024759 A2 20020328 (200249)\* EN 56 C08F002-44 <--

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PH PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW

US 2002058740 A1 20020516 (200249) C08K003-34 <--

AU 2001089118 A 20020402 (200252) C08F002-44 <--

EP 1328554 A2 20030723 (200350) EN C08F002-44 <--

R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR

BR 2001013998 A 20030812 (200367) C08F002-44 <--

CN 1462283 A 20031217 (200420) C08F002-44 <--

ADT JP 2004509986 W 20040402 (200424) 92 C08F002-44 <--  
WO 2002024759 A2 WO 2001-US28992 20010917; US 2002058740 A1 Provisional US  
2000-234263P 20000921, Provisional US 2000-257041P 20001221, US  
2001-954135 20010917; AU 2001089118 A AU 2001-89118 20010917; EP 1328554  
A2 EP 2001-968914 20010917, WO 2001-US28992 20010917; BR 2001013998 A BR  
2001-13998 20010917, WO 2001-US28992 20010917; CN 1462283 A CN 2001-816053  
20010917; JP 2004509986 W WO 2001-US28992 20010917, JP 2002-529167  
20010917

FDT AU 2001089118 A Based on WO 2002024759; EP 1328554 A2 Based on WO  
2002024759; BR 2001013998 A Based on WO 2002024759; JP 2004509986 W Based  
on WO 2002024759

PRAI US 2000-257041P 20001221; US 2000-234263P 20000921;  
US 2001-954135 20010917

IC ICM C08F002-44; C08K003-34  
ICS C08K003-00; C08K009-04

AB WO 200224759 A UPAB: 20040408  
NOVELTY - Ethylenically unsaturated monomer (EUM) (I) and **aqueous clay** dispersion comprising at least partially exfoliated **clay** containing exchangeable **cation** (I) and optionally EUM (II), are combined. **Cation** (II) which exchanges with **cation** (I) to form modified **aqueous clay** dispersion is added, and portion of monomer is polymerized to form **aqueous nanocomposite** dispersion. At least one of monomer comprises polar monomer.

DETAILED DESCRIPTION - Ethylenically unsaturated monomer(s) (I), and **aqueous clay** dispersion comprising an at least partially exfoliated **clay** containing exchangeable **cation** (I) and optionally ethylenically unsaturated monomer(s) (II), are combined. A **cation** (II) which exchanges with at least a portion of **cation** (I) to form a modified **aqueous clay** dispersion is added. At least a portion of monomer is polymerized to form **aqueous nanocomposite** dispersion. At least one of the ethylenically unsaturated monomer comprises a polar monomer.

USE - In coating, adhesive, caulking, sealant, thermoplastic resin and textiles. The coating composition are used as architectural coatings particularly low volatile content application for semigloss and gloss; factory applied coatings (metal and wood, thermoplastic and thermosetting); maintenance coatings (overmetal) automotive coatings; concrete roof tile coatings; **elastomeric** roof coatings; **elastomeric** wall coatings; external insulating finishing system; paper or paper board coating; overprint varnishes; fabric coatings and backcoatings; leather coatings; and cementitious roof tile coatings. The dispersion is also useful in opaque polymer and hollow sphere pigments; polish; binders (for nonwovens, paper coatings, pigment printing or inkjet); adhesive (pressure sensitive, flocking adhesives, laminating adhesive, packaging adhesive, hot melted adhesive, reactive adhesive, flexible or rigid industrial adhesive or other **water basic** adhesives); plastic additives; ion exchange resin; hair fixatives; traffic paint; ink composition used for flexographic ink, gravure ink, ink jet ink and pigment printing paste for application on film, sheet, reinforcement plastic composite, paper board, metal foil, fabric, metal, glass and wood; and digital imaging composition used for electrophotography.

ADVANTAGE - The method does not utilize additional polymers or solvent to enhance the affinity between **clay** and polymer at interface and improve overall mechanical property of **nanocomposite**. The enhanced affinity results in increased physical properties such as physical strength. The coating composition containing **nanocomposite** dispersion exhibits improved block, print and dirt

pickup resistance, enhanced barrier properties and enhanced flame retardance, toughness and strength. The coating composition can utilize soft binders without need for solvent for film formation and still maintains sufficient hardness, toughness and lower tack in dried film. The high acid polymer composition with **nanocomposite** dispersion has increased hardness. The **nanocomposite** dispersion imparts high block resistance when used in paint composition, enhanced heat sealed resistance and toughness in ink binder composition. The **nanocomposite** dispersion has resistance to weathering and is inexpensive.

DESCRIPTION OF DRAWING(S) - The figure shows the graphical representation of tensile strength elongation of **aqueous nanocomposite** composition.

Dwg.1/2

FS CPI EPI  
FA AB; GI  
MC CPI: A08-R01; A10-B01; A12-A05; A12-B01; A12-R08; G02-A02; G03-B02C;  
G04-B02  
EPI: T04-G02C

L75 ANSWER 32 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN  
AN 2002-749472 [81] WPIX  
DNN N2002-590170 DNC C2002-212418  
TI Polymer **nanocomposite** as engineering plastic, comprises high molecular substrate, layer structured inorganic and polyelectrolyte which carries opposite charge of inorganic material and attached on inorganic material.  
DC A18 A25 A92 A95 E19 Q68  
IN KUO, W; LEE, M; LEE, S; WU, J  
PA (KOGY-N) ZH KOGYO GIJUTSU KENKYUHIN; (INTE-N) IND TECHNOLOGY RES INST  
CYC 2  
PI US 2002086932 A1 20020704 (200281)\* 20 C08K003-34 <--  
JP 2002146211 A 20020522 (200281) 13 C08L101-00 <--  
US 6710111 B2 20040323 (200421) C08K003-34 <--  
ADT US 2002086932 A1 US 2001-859394 20010518; JP 2002146211 A JP 2001-160624  
20010529; US 6710111 B2 US 2001-859394 20010518  
PRAI TW 2000-122542 20001026  
IC ICM **C08K003-34; C08L101-00**  
ICS B82B001-00; **C08J003-215; C08K003-00;**  
**C08K011-00**  
ICI C08L039:00; C08L101-00  
AB US2002086932 A UPAB: 20021216

NOVELTY - The polymer **nanocomposite** comprises high molecular substrate (in weight%) (60-99), layer structured inorganic (0.5-30) well dispersed, coated evenly on the molecular substrate and polyelectrolyte (0.5-30). The polyelectrolyte carries an opposite charge of the layer structured inorganic material and is attached onto the inorganic material.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for the preparation of the polymer **nanocomposite**. A layer structured inorganic solution is combined with a polyelectrolyte solution to obtain a mixture solution. The polyelectrolyte has opposite and greater amount of charges with respect to the layer structured inorganic material. The polyelectrolyte is attached on the layer structured inorganic material. The obtained mixture solution is combined with a polymer **latex**, which carries opposite charges with respect to the polyelectrolyte, by co-agglutination. A layer structured inorganic/polyelectrolyte/polymer **nanocomposite** is obtained.

USE - For vehicle portions and as engineering plastics.

ADVANTAGE - The polymer **nanocomposite** is well-dispersed and is easily obtained by coagulation method. The method produces **nanocomposites** without additional equipment and cost except polyelectrolytes. Use of large amounts of organic solvent are avoided.

Dwg.0/11

FS CPI GMPI  
FA AB; DCN  
MC CPI: A11-A03; A12-M02; A12-S; A12-T04; E05-T; E10-A22; E31-P; E31-P02;  
E31-P04; E31-P05

L75 ANSWER 33 OF 59 RAPRA COPYRIGHT 2004 RAPRA on STN  
AN R:882480 RAPRA FS Rapra Abstracts  
TI POLYMERIC **NANOCOMPOSITES**. I.  
AU Arroyo M; Lopez M A (Instituto de Ciencia y Tecnologia de Polimeros)  
SO Revista de Plasticos Modernos 83, No.549, March 2002, p.290-5  
ISSN: 0034-8708

CODEN: RPMDAM

PY 2002

DT Journal

LA Spanish

AB Consideration is given to the structure, properties and characterisation of **nanocomposites** consisting of silicate **nano****partic****les** dispersed in a polymer matrix. Compatibilisers and coupling agents used in the preparation of such composites are also examined. 22 refs.

CC 51SCL; 59A; 59D; 627; 9; 9T; 9113

SC \*OK; MB; MJ; UA; UB; UC

CT ADDITIVE; ADDUCT; AMIDE POLYMER; ANALYSIS; APPLICATION; ASPECT RATIO; AUTOMOTIVE APPLICATION; BLOCK COPOLYMER; CAR; **CATION**; CERAMIC; CHARACTERISATION; CHARACTERIZATION; CHEMICAL PROPERTIES; CHEMICAL RESISTANCE; CHEMICAL RESISTANT; CHEMICAL STRUCTURE; COMPATIBILISER; COMPATIBILIZER; COMPOSITE; COUPLING AGENT; CRYSTALLINITY; CRYSTALLISATION; CRYSTALLIZATION; DATA; DEFLECTION TEMPERATURE UNDER LOAD; DENSITY; DIFFRACTION; DISPERSION; EB; **ELASTOMER**; ELECTRICAL PROPERTIES; ELONGATION AT BREAK; EPOXIDE RESIN; EPOXY RESIN; EXFOLIATED; EXTRUDING; EXTRUSION; FILLER; FLAMMABILITY; FREE VOLUME; GLASS TRANSITION TEMPERATURE; GRAPH; IMPACT PROPERTIES; IMPACT STRENGTH; IN-SITU; INJECTION MOLDING; INJECTION MOULDING; INSTITUTION; INTERCALATED; INTERFACE; ION; ION EXCHANGE; ION-EXCHANGE; LIQUID CRYSTAL POLYMER; MAGNET; MAGNETIC; MAGNETIC PROPERTIES; MATRIX; MECHANICAL PROPERTIES; MEMBRANE; MICROCOMPOSITE; MICROSTRUCTURE; MOLECULAR MOBILITY; MOLECULAR STRUCTURE; **NANOCOMPOSITE**; **NANO****partic****le**; **NANOTUBE**; NYLON; NYLON-6; OPTICAL PROPERTIES; PACKAGING; PARACRYSTALLINE; **PARTICLE SHAPE**; **PARTICLE SIZE**;

PERCOLATION; PHASE SEPARATION; PLASTIC; POLARITY; POLYAMIDE; POLYAMIDE-6; POLYEPOXIDE; POLYPROPENE; POLYPROPYLENE; PP; PROPERTIES; RELAXATION; **RUBBER**; SCANNING ELECTRON MICROSCOPY; SEM; SEMI-CRYSTALLINE; SEMICONDUCTOR; SEMICRYSTALLINE; SOL-GEL; SPHERICAL; STRUCTURE-PROPERTY RELATIONSHIP; SUPERMAGNETIC; SURFACE AREA; TABLES; TEAR STRENGTH; TECHNICAL; TEM; TENSILE PROPERTIES; TG; THERMAL PROPERTIES; THERMAL TRANSITION; THERMOPLASTIC; THERMOSET; TRANSMISSION ELECTRON MICROSCOPY; UNSATURATED POLYESTER; WHISKER; X-RAY DIFFRACTION; X-RAY SCATTERING

NPT ALKYLAMINE; ALKYLAMMONIUM ION; AMINO ACID; **CLAY**;

HECTORITE; MONTMORILLONITE; PHYLLOSILICATE; SAPONITE; SILANE; SILICATE

SHR COMPOSITES, plastics, fillers in, properties, molecular structure, analysis, compatibilisers, coupling agents; FILLERS IN, composites, plastics; FILLERS OF, silicates, compatibilisers, coupling agents; COUPLING AGENTS, composites, plastics, fillers; MOLECULAR STRUCTURE,

composites, plastics; COMPATIBILISERS, composites, plastics, fillers;  
ANALYSIS, composites, plastics

GT EUROPEAN COMMUNITY; EUROPEAN UNION; SPAIN; WESTERN EUROPE

L75 ANSWER 34 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 2002:348388 HCPLUS

DN 137:94995

ED Entered STN: 10 May 2002

TI Study on mechanical property of exfoliated silicone **rubber/clay nanocomposites**

AU Zhou, Ninglin; Xia, Xiaoxian; Wang, Yanru

CS Department of Chemical Engineering, Nanjing University of Chemical Technology, Nanjing, 210009, Peop. Rep. China

SO Gaofenzi Xuebao (2002), (2), 253-256

CODEN: GAXUE9; ISSN: 1000-3304

PB Kexue Chubanshe

DT Journal

LA Chinese

CC 39-9 (Synthetic Elastomers and Natural **Rubber**)

AB A exfoliated silicone **rubber/clay**

**nanocomposite** was prepared from hydroxyl-terminated polydimethylsiloxane and organoclays. HTAB and TPAC were used as swelling agents to treat Na-montmorillonite for forming organoclays. The organoclays and **nanocomposite** were confirmed by X-ray diffraction (XRD). The d-spacing in TPAC-mont is 4.96 nm, being larger than that of the HTAB-mont. The mech. properties of the **nanocomposites** have been measured by tensile testing machine. The nanometer-scale silicate layers of TPAC-mont were completely exfoliated in silicone **rubber** matrix in the cases of 1% to 10% TPAC-mont content. The **nanocomposites** exhibit markedly improved mech. properties and thermal stability when compared with the pure polymer or conventional aerosilica-filled silicone **rubber**. A 200% .apprx. 300% increase in the tensile strength and a 100% increase in the elongation at break were found for TPAC-mont/silicone **rubber** as compared to that of pure silicone **rubber**. The reinforcing and intercalating mechanism of silicate layers in silicone **rubber** matrix were discussed.

ST silicone **rubber clay nanocomposite** mech

IT Elongation, mechanical

Nanocomposites

Polymer morphology

Tensile strength

(mech. property of exfoliated silicone **rubber/clay nanocomposites**)

IT Silicone **rubber**, properties

RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)

(mech. property of exfoliated silicone **rubber/clay nanocomposites**)

IT 57-09-0, Hexadecyltrimethylammonium bromide 62117-57-1

RL: MOA (Modifier or additive use); USES (Uses)

(mech. property of exfoliated silicone **rubber/clay nanocomposites**)

IT 155827-81-9, Dimethylsiloxanediol-tetraethyl silicate copolymer

RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)

(rubber; mech. property of exfoliated silicone **rubber/clay nanocomposites**)

IT 1318-93-0, Montmorillonite, properties

RL: PRP (Properties); TEM (Technical or engineered material use); USES

(Uses)

(sodium-exchanged; mech. property of exfoliated silicone **rubber**/clay nanocomposites)

L75 ANSWER 35 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN  
AN 2002:891199 HCPLUS  
DN 138:288832  
ED Entered STN: 25 Nov 2002  
TI Research on **rubber**/ modified **montmorillonite** nanocomposites - effect of different modification techniques  
AU Wang, Lei; Zhou, Yan; Jia, De-min  
CS College of Materials Science and Engineering, South China University of Technology, Canton, 510640, Peop. Rep. China  
SO Tanxingt (2002), 12(4), 20-23  
CODEN: TANXFA; ISSN: 1005-3174  
PB Huagongbu Hecheng Xiangjiao Xinxizhan  
DT Journal  
LA Chinese  
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)  
AB Several different modification techniques were adopted to organize **montmorillonite**, and **rubber**/modified **montmorillonite** nanocomposites were prepared by **rubber latex** co-deposition. The effects of modification techniques on structure and properties of the composites were studied and a new ultrasonic modification was introduced. A cheap, time-saving, high efficiency technique was chosen.  
ST **rubber** modified **montmorillonite** nanocomposite  
IT Deformation (mechanical)  
Elongation at break  
    **Nanocomposites**  
    Polymer morphology  
    Tensile strength  
        (effect of modification on **rubber**/ modified **montmorillonite** nanocomposites)  
IT Natural **rubber**, properties  
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
    (effect of modification on **rubber**/ modified **montmorillonite** nanocomposites)  
IT Strength  
    (tearing; effect of modification on **rubber**/ modified **montmorillonite** nanocomposites)  
IT 57-09-0, Hexadecyltrimethylammonium bromide **1318-93-0**,  
**Montmorillonite**, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
    (effect of modification on **rubber**/ modified **montmorillonite** nanocomposites)

L75 ANSWER 36 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN  
AN 2001:489537 HCPLUS  
DN 135:93413  
ED Entered STN: 06 Jul 2001  
TI Thermoplastic olefin nanocomposites with cation-exchanged layered silicates  
IN Chou, Chai-jing; Garcia-Meinin, Eddy I.; Schilhab, Lonnie; Fibiger, Richard F.  
PA The Dow Chemical Company, USA  
SO PCT Int. Appl., 24 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM C08L023-10

ICS C08K009-04; C08L051-06

CC 37-6 (Plastics Manufacture and Processing)

Section cross-reference(s): 39

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI WO 2001048080	A1	20010705	WO 2000-US34707	20001220
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W: BR, CA, CN, JP, KR, MX, US  
 RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL,  
 PT, SE, TR

BR 2000016948	A	20020910	BR 2000-16948	20001220
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EP 1268656	A1	20030102	EP 2000-986634	20001220
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R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
 IE, FI, CY, TR

JP 2003518542	T2	20030610	JP 2001-548611	20001220
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PRAI US 1999-173608P	P	19991229
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WO 2000-US34707	W	20001220
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AB A thermoplastic olefin **nanocomposite** composition comprises: (a) a maleated polypropylene polymer phase having a weight average mol. weight greater

than 100,000; (b) a **cation** exchanging layered silicate material dispersed in the maleated polypropylene phase so that more than one half of the **cation** exchanging layered silicate material is present as one, two, three, four or five layer units upon examination by electron microscopy; and (c) a thermoplastic **elastomer** phase interdispersed with the maleated polypropylene phase.

ST thermoplastic olefin **nanocomposite cation** exchanged layered silicate; maleated polypropylene **nanocomposite**

IT **Quaternary** ammonium compounds, uses

RL: MOA (Modifier or additive use); USES (Uses)  
 (bis(hydrogenated tallow alkyl)dimethyl, reaction products with **montmorillonite**; thermoplastic olefin **nanocomposites** with **cation**-exchanged layered silicates)

IT Polyolefin **rubber**

RL: POF (**Polymer in formulation**); TEM (Technical or engineered material use); USES (Uses)  
 (ethylene-octene; thermoplastic olefin **nanocomposites** with **cation**-exchanged layered silicates)

IT Silicates, uses

RL: MOA (Modifier or additive use); USES (Uses)  
 (layered, **cation** exchanging; thermoplastic olefin **nanocomposites** with **cation**-exchanged layered silicates)

IT Impact-resistant materials

**Nanocomposites**

(thermoplastic olefin **nanocomposites** with **cation**-exchanged layered silicates)

IT Thermoplastic **rubber**

RL: POF (**Polymer in formulation**); TEM (Technical or engineered material use); USES (Uses)  
 (thermoplastic olefin **nanocomposites** with **cation**-exchanged layered silicates)

IT 1318-93-0D, **Montmorillonite**, reaction products with di-Me, dihydrogenated tallow **quaternary** ammonium compds.

RL: MOA (Modifier or additive use); USES (Uses)  
(thermoplastic olefin **nanocomposites** with **cation**-exchanged layered silicates)

IT 9003-07-0D, Polypropylene, maleated 26221-73-8, AFFINITY 8180

RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)  
(thermoplastic olefin **nanocomposites** with **cation**-exchanged layered silicates)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L75 ANSWER 37 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 2001:534486 HCPLUS

DN 135:123335

ED Entered STN: 25 Jul 2001

TI ABS **nanocomposite** material with high mechanical strength and manufacture of the material

IN Kuo, Wen Ta; Li, Mao Sung; Huang, Hsiao Ping; Wu, Chia Kuang; Chung, Sujing Cheng

PA Industrial Technology Research Institute, Taiwan

SO Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C08L055-02

ICS C08F002-02; C08F002-18; C08F002-44; C08J003-20; C08K003-34;  
C08K005-00; C08K009-04

CC 37-6 (Plastics Manufacture and Processing)

Section cross-reference(s): 39

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001200135	A2	20010724	JP 2000-257201	20000828
	TW 518354	B	20030121	TW 2000-89100792	20000119

PRAI TW 2000-89100792 A 20000119

AB The **nanocomposite** is made of a polymer matrix containing ABS [acrylonitrile (I)-butadiene-styrene (II) resin] and a layered **clay** uniformly dispersed in the matrix optionally associated with a fireproofing agent. The composite is manufactured by the process involving (1) preparing a precursor **nanocomposite** comprising I-II copolymer matrix and the layered **clay** dispersed in the matrix and (2) blending the precursor and butadiene **rubber** optionally containing a fireproofing agent. Thus, 25:75 mixture of I and II were subjected to bulk-polymerization in the presence of fluoromica, which was ion-exchanged with benzalkonium ion and 4-vinylpyridinium ion, followed by suspension polymerization

in **aqueous** poly(vinyl alc.) to give a precursor containing 5% fluoromica. Then, the precursor was blended with I-II copolymer (PN 117) and butadiene **rubber** (Blendex 338) in a twin-screw extruder to give the **nanocomposite** containing 3% fluoromica and 18% **rubber** showing elongation 24%, bending strength 754 kg/cm<sup>2</sup>, and

- ST notched Izod impact strength 11.99 kg-cm/cm.  
**nanocomposite** ABS resin layered **clay**; acrylonitrile styrene polymer butadiene **rubber** matrix; mech strength  
**nanocomposite** resin layered **clay**; fireproofing agent ABS resin **clay nanocomposite**; ion exchanged fluoromica ABS resin **nanocomposite**
- IT **Quaternary** ammonium compounds, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(alkylbenzyldimethyl, chlorides, fluormica-treated with;  
**nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)
- IT Onium compounds  
RL: MOA (Modifier or additive use); USES (Uses)  
(**cation**; **nanocomposite** comprising matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber** and layered **clay** containing)
- IT Mica-group minerals, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(fluorine-rich, ion-exchanged; **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)
- IT Antioxidants  
Antistatic agents  
Fillers  
Fireproofing agents  
Light stabilizers  
Lubricants  
Plasticizers  
UV stabilizers  
(in **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)
- IT **Nanocomposites**  
(**nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)
- IT Butadiene **rubber**, properties  
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PROC (Process); USES (Uses)  
(**nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)
- IT **Clays**, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(smectitic; **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)
- IT 9003-56-9, ABS-D 100  
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(ABS-D 100; **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)
- IT 9003-54-7, PN 117  
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; TEM (Technical or engineered material use); PROC

(Process); USES (Uses)

(PN 117; **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT 9003-17-2

RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PROC (Process); USES (Uses) (butadiene **rubber**, **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT 86168-32-3, FR 68PB

RL: MOA (Modifier or additive use); USES (Uses) (fireproofing agent; in **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT 3283-40-7

RL: MOA (Modifier or additive use); USES (Uses) (fluormica-treated with; **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT 1318-93-0DP, **Montmorillonite**, ion-exchanged, preparation

RL: IMF (Industrial manufacture); MOA (Modifier or additive use); PREP (Preparation); USES (Uses) (**nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT 1318-00-9, vermiculite 1319-41-1, saponite 12068-50-7, Halloysite

12172-85-9, **Beidellite** 12173-47-6,

**Hectorite** 12174-06-0, nontronite 12174-53-7, Sericite

12417-86-6, Stevensite

RL: MOA (Modifier or additive use); USES (Uses) (**nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT 106677-58-1, Blendex 338

RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(**nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

L75 ANSWER 38 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2002-025702 [03] WPIX

DNN N2002-019950 DNC C2002-007046

TI Flame retardant polyolefin composition for sheets or laminates used as roofing membranes and protective coatings, comprises organically modified **clay**.

DC A17 A93 P73

IN KAUSCH, C; PAYNE, P F; PETERSON, K M; POMEROY, J E; VERROCCHI, A  
PA (OMNO-N) OMNOVA SOLUTIONS INC

CYC 22

PI WO 2001066627 A1 20010913 (200203)\* EN 30 C08K003-34 <--

RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR  
W: JP

US 6414070 B1 20020702 (200248) C08K003-34 <--

EP 1268630 A1 20030102 (200310) EN C08K003-34 <--

R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

JP 2003530444 W 20031014 (200368) 28 C08L023-00 <--  
 ADT WO 2001066627 A1 WO 2001-US2278 20010124; US 6414070 B1 US 2000-521457  
 20000308; EP 1268630 A1 EP 2001-905016 20010124, WO 2001-US2278 20010124;

FDT JP 2003530444 W JP 2001-565790 20010124, WO 2001-US2278 20010124  
 EP 1268630 A1 Based on WO 2001066627; JP 2003530444 W Based on WO  
 2001066627

PRAI US 2000-521457 20000308

IC ICM C08K003-34; C08L023-00

ICS B32B027-18; B32B027-20; C08J005-18; C08K009-04

AB WO 200166627 A UPAB: 20020114

NOVELTY - A flame retardant polyolefin composition comprises polyolefin polymer and/or copolymer having 2-8 carbon per repeat group; organically modified **clay**; and optionally inorganic flame retardant(s). The polyolefin and **clay** are **nanocomposite**.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:

(A) a flame retardant sheet comprising the above composition;

(B) a flame retardant laminate comprising a reinforcing layer; polymer layer; and a flame retardant **nanocomposite** layer comprising the above composition;

(C) a method for preparing a flame retardant composition comprising mixing and forming a flame retardant **nanocomposite**; and

(D) a method for preparing a flame retardant **nanocomposite** or flame retardant sheet.

USE - For sheets or laminates used as roofing membranes and protective coatings.

ADVANTAGE - The invented composition offers excellent flame retardant and flame resistant properties.

Dwg.0/0

FS CPI GMPI

FA AB

MC CPI: A04-G01B; A08-F; A08-F01; A12-R05

L75 ANSWER 39 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2002-165794 [22] WPIX

DNN N2002-126614 DNC C2002-051273

TI **Nanocomposite**, useful as sheath or outer coating of power and telecommunication cables, comprises a **clay** bridged with a metal compound, and an organic compound.

DC A85 X12

IN AMIGUET, P; BERGAYA, F; FOMPERIE, L; MANDALIA, T

PA (NEXA-N) NEXANS; (COGE) ALCATEL SA

CYC 29

PI EP 1160277 A1 20011205 (200222)\* EN 10 C08K009-02 <--  
 R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT

RO SE SI TR

CA 2349141 A1 20011130 (200222) EN C08K003-34 <--

FR 2809737 A1 20011207 (200222) C08K003-34 <--

US 2002010248 A1 20020124 (200222) B01J021-16

JP 2002053316 A 20020219 (200229) 22 C01B033-44

US 6674009 B2 20040106 (200411) H01B003-00

ADT EP 1160277 A1 EP 2001-401232 20010514; CA 2349141 A1 CA 2001-2349141  
 20010529; FR 2809737 A1 FR 2000-7017 20000531; US 2002010248 A1 US  
 2001-866836 20010530; JP 2002053316 A JP 2001-161109 20010529; US 6674009  
 B2 US 2001-866836 20010530

PRAI FR 2000-7017 20000531

IC ICM B01J021-16; C01B033-44; C08K003-34; C08K009-02;

H01B003-00

ICS C08J003-00; C08L023-06; C08L101-00;

H01B003-28; H01B003-30; H01B003-40; H01B003-42; H01B003-44;  
H01B007-295; H01B009-00; H01B011-00

ICA B01J029-04

AB EP 1160277 A UPAB: 20020409

NOVELTY - **Nanocomposite** comprising (i) a **clay** bridged  
with a metal compound and (ii) an organic compound.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for: (1)  
a process for producing the **nanocomposite** of the claim  
comprising preparing the bridged **clay**, and mixing with organic  
compound; (2) a power cable comprising the **nanocomposite** of the  
claim either in its sheath, as its sheath or as an outer coating for its  
sheath; and (3) a telecommunications cable comprising the  
**nanocomposite** of the claim in its sheath.

USE - For use as sheath or outer coating of cables, e.g., power cable  
or telecommunication cable.

ADVANTAGE - The inventive **nanocomposite** exhibits improved  
mechanical properties, good heat resistance, excellent fire resistance,  
and improved **water** and solvent impermeability.

Dwg.0/2

FS CPI EPI

FA AB

MC CPI: A07-A05; A12-E02A

EPI: X12-D05

L75 ANSWER 40 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 2001:631138 HCPLUS

DN 135:345665

ED Entered STN: 31 Aug 2001

TI **Clay Nanolayer Reinforcement of a Silicone Elastomer**

AU LeBaron, Peter C.; Pinnavaia, Thomas J.

CS Department of Chemistry and Center for Fundamental Materials Research,  
Michigan State University, East Lansing, MI, 48824, USA

SO Chemistry of Materials (2001), 13(10), 3760-3765

CODEN: CMATEX; ISSN: 0897-4756

PB American Chemical Society

DT Journal

LA English

CC 39-9 (Synthetic Elastomers and Natural **Rubber**)

Section cross-reference(s): 38

AB A synthetic fluorohectorite **clay** in which the exchange  
**cations** have been replaced by hexadecyltrimethylammonium ions,  
abbreviated C16FH, has been shown to readily intercalate linear  
poly(dimethylsiloxane) (PDMS) mols. containing terminal hydroxyl groups. The  
extent of gallery swelling increased with increasing PDMS mol. weight over  
the range 400-4200. Little or no intercalation was observed for PDMS mols.  
terminated by Me groups, indicating that terminal silanol interactions  
with the gallery surfaces are an important part of the gallery swelling  
mechanism. These interfacial interactions may also account for the  
unusual correlation between the extent of gallery swelling and the mol.  
weight of the intercalated linear polymer. Crosslinking reactions between  
PDMS-4200 and tetra-Et orthosilicate in the presence of the C16FH  
organoclay afforded **elastomeric nanocomposites** in  
which the **clay nanolayers** were exfoliated. The  
**nanolayer**-reinforced polymer exhibited substantially improved  
tensile properties and resistance to swelling by an organic solvent in  
comparison to the pristine polymer. Also, **nanolayer**  
reinforcement greatly reduced the structural damage caused by the internal

strain induced upon allowing the solvent to evaporate from the swollen polymer network. Although synthetic fluorohectorite has one of the highest **nanolayer** aspect ratios among smectite **clays**, relatively small redns. in oxygen permeability were observed for the **nanocomposites**. A more or less random orientation of the **clay nanolayers** in the polymer matrix, as indicated from TEM images of thin sectioned samples, was responsible for the lack of an effective permeant barrier.

ST **clay nanolayer** silicone **rubber** intercalated; fluorohectorite hexadecyltrimethylammonium exchanged silicone **rubber nanocomposite**; intercalation polysiloxane ion exchanged fluorohectorite

IT Elongation, mechanical

**Nanocomposites**

Permeability

Stress-strain relationship

Swelling, physical

(hexadecyltrimethylammonium bromide-exchanged fluorohectorite **clay** intercalation with linear poly(dimethylsiloxane))

IT Polysiloxanes, preparation

Silicone **rubber**, preparation

RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)

(hexadecyltrimethylammonium bromide-exchanged fluorohectorite **clay** intercalation with linear poly(dimethylsiloxane))

IT 7782-44-7, Oxygen, miscellaneous

RL: MSC (Miscellaneous)

(hexadecyltrimethylammonium bromide-exchanged fluorohectorite **clay** intercalation with linear poly(dimethylsiloxane))

IT 31692-79-2D, Poly(dimethylsiloxane) hydroxy-terminated, intercalation compds. with hexadecyltrimethylammonium ion-exchanged fluorohectorite **clay** 31900-57-9D, Dimethylsilanediol homopolymer, hydroxy- and methyl-terminated, intercalation compds. with hexadecyltrimethylammonium ion-exchanged fluorohectorite **clay**

RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)

(hexadecyltrimethylammonium bromide-exchanged fluorohectorite **clay** intercalation with linear poly(dimethylsiloxane))

IT 57-09-0DP, Hexadecyltrimethylammonium bromide, ion exchanged on fluorohectorite-exchanged, intercalation compds. with polydimethylsiloxanes 12173-47-6DP, Fluorohectorite, hexadecyltrimethylammonium bromide-exchanged, intercalation compds. with polydimethylsiloxanes

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(hexadecyltrimethylammonium bromide-exchanged fluorohectorite **clay** intercalation with linear poly(dimethylsiloxane))

IT 160998-16-3DP, Dimethylsilanediol-tetraethyl orthosilicate copolymer, intercalation compds. with hexadecyltrimethylammonium ion-exchanged fluorohectorite **clay**

RL: POF (Polymer in formulation); PRP (Properties); SPN

(Synthetic preparation); PREP (Preparation); USES (Uses)

(**rubber**; hexadecyltrimethylammonium bromide-exchanged fluorohectorite **clay** intercalation with linear poly(dimethylsiloxane))

RE.CNT 39 THERE ARE 39 CITED REFERENCES AVAILABLE FOR THIS RECORD

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- (39) Yano, K; J Polym Sci, Part A: Polym Chem 1997, V35, P2289 HCPLUS

L75 ANSWER 41 OF 59 RAPRA COPYRIGHT 2004 RAPRA on STN DUPLICATE 6  
AN R:832041 RAPRA FS Rapra Abstracts  
TI **CLAY NANOLAYER REINFORCEMENT OF cis-1,4-POLYISOPRENE**  
AND EPOXIDISED NATURAL **RUBBER**.  
AU Yen T Vu; Mark J E; Pham Ly H; Engelhardt M (Cincinnati, University;  
Hanoi, Institute of Chemistry; Yokohama **Tire** Corp.)  
SO Journal of Applied Polymer Science 82, No.6, 7th Nov.2001, p.1391-403  
ISSN: 0021-8995  
CODEN: JAPNAB  
PY 2001  
DT Journal  
LA English  
AB The conditions required for dispersing sodium **montmorillonite**  
**clay nanolayers** into **cis-1,4-polyisoprene** (synthetic)  
natural **rubber** (NR) and epoxidised natural **rubbers**  
(ENR) containing 25 and 50 mole% epoxide were established. The  
**clay** was used as a pristine layered silicate or as organically  
modified silicate layers, to make the galleries more hydrophobic and thus  
more compatible with the **elastomers**. Ion exchange with alkyl  
ammonium **cations** was used for chemical modification. The  
**clays** were incorporated into the **elastomers** by mixing

the components in a standard internal blender or by mixing their dispersions in toluene or methyl ethyl ketone. The X-ray diffraction patterns indicated intercalation of the NR and ENR into the silicate interlayers, with subsequent exfoliation of the silicate layers into the elastomer matrices. The observed mechanical reinforcement of the elastomers by the intercalated and exfoliated clays was strongly dependent on the extent of dispersion of the silicate layers into the rubber matrices, and was of primary interest. 61 refs.

CC 51SC1; 42D121; 41C1; 9924; 9.11; 95

SC \*MB; IA; KO; UG; UC

CT BLEND; CHEMICAL MODIFICATION; COMPANIES; COMPANY; DATA; DISPERSION;

DYNAMIC MECHANICAL PROPERTIES; DYNAMIC PROPERTIES; ELASTOMER;

EPOXIDISED NR; EPOXIDIZED NR; EXFOLIATION; FILLER; GRAPH; HYDROGENATION;

INSTITUTION; INTERCALATION; ION EXCHANGE; ION-EXCHANGE; ISOPRENE POLYMER;

LOSS TANGENT; MECHANICAL PROPERTIES; MORPHOLOGICAL PROPERTIES;

MORPHOLOGY; NANOCOMPOSITE; NANOLAYER; NATURAL

RUBBER; NR; POLYISOPRENE; PROPERTIES; REINFORCEMENT; RUBBER

; STRAIN; STRESS; STRESSES; SYNTHETIC RUBBER; TABLES;

TECHNICAL; WIDE ANGLE X-RAY SCATTERING; X-RAY SCATTERING

NPT AMMONIUM ION; CALCIUM STEARATE; CLAY; ETHYL METHYL KETONE;

METHYLBENZENE; STEARIC ACID; SULFUR; SULPHUR; TALLOW; TOLUENE; ZINC OXIDE

SHR NATURAL RUBBER, X-ray diffraction, mechanical properties,

morphological properties, nanocomposites; ISOPRENE POLYMERS,

X-ray diffraction, mechanical properties, morphological properties,

nanocomposites; X-RAY DIFFRACTION, NR, isoprene polymers,

mechanical properties, morphological properties, nanocomposites

; MECHANICAL PROPERTIES, NR, isoprene polymers, X-ray diffraction,

morphological properties, nanocomposites; MORPHOLOGICAL

PROPERTIES, Nr, isoprene polymers, X-ray diffraction, mechanical

properties, nanocomposites; COMPOSITES, NR, isoprene polymers,

nanocomposites, X-ray diffraction, mechanical properties,

morphological properties

GT USA; VIETNAM

L75 ANSWER 42 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 7

AN 2001:317534 HCAPLUS

DN 135:62512

ED Entered STN: 04 May 2001

TI Surface-compatibilized layered silicates: a novel class of nanofillers for rubbers with improved mechanical properties

AU Ganter, M.; Gronski, W.; Semke, H.; Zilg, T.; Thomann, C.; Muhlaupt, R.

CS Freiburg, Germany

SO Kautschuk Gummi Kunststoffe (2001), 54(4), 166-171

CODEN: KGUKAC; ISSN: 0022-9520

PB Huethig GmbH

DT Journal

LA English

CC 39-9 (Synthetic Elastomers and Natural Rubber)

AB Layered silicates were made compatible with SBR rubber matrix by (i) swelling a com. organophilic clay of the Montmorillonite type in SBR solution and (ii) by cation exchange of a synthetic Fluorhectorite with protonated amino-terminated polybutadiene (ATB). The effect of the surface-compatibilized silicates relative to conventional silica filler was tested with SBR vulcanizates in which silica was either completely or partially exchanged by layered silicate. TEM reveals the morphol. of the rubber nanocomposites with finely

dispersed intercalated aggregates or partially exfoliated layers suggesting that reinforcement and hysteresis are related to the anisotropic nature of the aggregates and concomitant orientation during strain.

- ST layered silicate surface compatibilized **SBR rubber**  
property
- IT Nitrile **rubber**, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(amine-terminated, Hycar ATB; mech. properties of **SBR**  
**rubber** containing surface-compatibilized layered silicates)
- IT Breaking strength  
Mechanical loss  
Polymer morphology  
Tensile strength  
(mech. properties of **SBR rubber** containing  
surface-compatibilized layered silicates)
- IT **Styrene-butadiene rubber**, properties  
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)  
(mech. properties of **SBR rubber** containing  
surface-compatibilized layered silicates)
- IT 7631-86-9, Silica, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(filler; mech. properties of **SBR rubber** containing  
surface-compatibilized layered silicates)
- IT 40372-72-3, Si69  
RL: MOA (Modifier or additive use); USES (Uses)  
(mech. properties of **SBR rubber** containing  
surface-compatibilized layered silicates)
- IT **1318-93-0D, Montmorillonite**, ammonium-exchanged  
182636-27-7, Somasif ME 100  
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical  
process); PROC (Process); USES (Uses)  
(mech. properties of **SBR rubber** containing  
surface-compatibilized layered silicates)
- IT 9003-18-3  
RL: MOA (Modifier or additive use); USES (Uses)  
(nitrile **rubber**, amine-terminated, Hycar ATB; mech.  
properties of **SBR rubber** containing  
surface-compatibilized layered silicates)
- IT 9003-55-8  
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)  
(**styrene-butadiene rubber**, mech.  
properties of **SBR rubber** containing  
surface-compatibilized layered silicates)
- RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
- RE
- (1) Galanti, A; Kautsch Gummi Kunstst 1999, V52, P21 HCAPLUS
  - (2) Ganter, M; Rubber Chem Technol submitted and Proceedings of the ACS,  
Division of Polymeric Materials: Science and Engineering 2000, V82, P228  
HCAPLUS
  - (3) Giannelis, E; Adv Mater 1996, V8, P29 HCAPLUS
  - (4) Hoffmann, B; Macromol Rapid Commun 2000, V21, P57 HCAPLUS
  - (5) Kawasumi, M; Macromolecules 1997, V30, P6333 HCAPLUS
  - (6) Kojima, Y; J Mater Sci Lett 1993, V12, P889 HCAPLUS
  - (7) Medalia, A; Science and Technology of Rubber, 2nd edition 1994, P38
  - (8) Okada, A; ACS Symposium Series 1995
  - (9) Reichert, R; Acta Polymerica 1998, V49, P116
  - (10) Zilg, C; Advanced Materials 1999, V11, P49 HCAPLUS

(11) Zilg, C; Macromol Chem & Phys 1999, V200, P661 HCPLUS

L75 ANSWER 43 OF 59 JICST-EPlus COPYRIGHT 2004 JST on STN  
AN 1011059152 JICST-EPlus  
TI Effective capture of **nanoparticles** onto LB film surface by the adsorption from their dispersions.  
AU TAMAKI URA; IMAI YOKO; TAJIMA KAZUO  
TAKAHASHI MASASHI; KOBAYASHI KOICHI  
CS Kanagawa Univ., Fac. of Eng.  
Musashi Inst. of Technol., Fac. of Eng.  
SO Yukagaku Toronkai Koen Yoshishu, (2001) vol. 40th, pp. 141. Journal Code:  
L0847A (Fig. 2, Tbl. 1, Ref. 1)  
ISSN: 1341-7231  
CY Japan  
DT Conference; Short Communication  
LA Japanese  
STA New  
AB The present paper was investigated on the preparation of close-packed unilayer arrangement with **nano**-size particles on bicationic LB film by the adsorption from their aqueous dispersions. Two LB layers of N,N'-o-xylylene-bis(octadecyldimethyl-ammonium chloride) was fabricated on the Si-wafer substrate on which the particles was adhesived. The kinds of used particles were synthetic polymer particles (88, 335, 533, and 923nm), SiO<sub>2</sub> particles (280 and 990nm), Au metal particles (29nm), and further amorphous carbon particles (62nm), and **clay** particles (45nm). The arrangement of adsorbed particle on the LB film was observed by the TEM or SEM photo image. As a result, synthetic polymer and SiO<sub>2</sub> articles was formed in a closest packed arrangement like a two dimensional crystal when surface potential of particles had been controlled near at almost their ZPC of about -0.29 to -3.0mV for these dispersion pHs. On the other hand, these dispersions at the neutral pH adsorbed in the widely. scattered and loosed order. Furthermore, it let me adsorb Au, Amorphous carbon and a **clay** minute article on the large area by using adsorption method. Consequently, a two-dimensional crystal of particle film was formed by controlling the surface potential of particles and their size distribution. (author abst.)  
CC BK14010X (539.23)  
CT LB film; ultrafine particle; silica; gold; carbon; **clay** mineral;  
**latex**; adsorption; **quaternary** ammonium  
BT membrane and film; fine particle; particle; silicon dioxide; silicon oxide; silicon compound; carbon group element compound; oxide; chalcogenide; oxygen group element compound; oxygen compound; 1B group element; transition metal; metallic element; element; second row element; carbon group element; soil mineral; mineral(geology); soil component; component; colloid; disperse system; emulsion; amine; onium compound  
ST **nanoparticle**

L75 ANSWER 44 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 2000:133762 HCPLUS

DN 132:167197

ED Entered STN: 25 Feb 2000

TI Intercalates formed with MXD6 nylon intercalants

IN Lan, Tie; Cruz, Hannah T.; Tomlin, Anthony S.

PA Amcol International Corporation, USA

SO PCT Int. Appl., 77 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM C08K009-04  
 ICS C08L077-00

CC 37-6 (Plastics Manufacture and Processing)  
 Section cross-reference(s): 39

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2000009605	A1	20000224	WO 1999-US18579	19990816
	W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	US 6232388	B1	20010515	US 1999-272278	19990319
	AU 9956751	A1	20000306	AU 1999-56751	19990816
	GB 2354002	A1	20010314	GB 2000-29174	19990816
	GB 2354002	B2	20030108		
	DE 19983538	T	20010712	DE 1999-19983538	19990816
PRAI	US 1998-96774P	P	19980817		
	US 1999-272278	A	19990319		
	WO 1999-US18579	W	19990816		

AB Intercalated layered materials are prepared by co-intercalation of an onium ion and MXD6 nylon between the planar layers of a swellable layered material, such as a phyllosilicate, preferably a smectite **clay**. The spacing of adjacent layers of the layered materials is expanded at least about 3 Å, preferably at least about 5 Å, usually preferably to a d-spacing of about 15-20 Å, e.g., 18 Å with the onium ion spacing/coupling agent. The intercalation of the MXD6 nylon polymer then increases the spacing of adjacent layers an addnl. at least 3 Å, e.g., to at least about 20 Å, preferably about 25 Å to about 30 Å, generally about 28 Å. Plastic and **rubber** composites containing the intercalated layered materials or/and their exfoliates have good dispersibility and low air permeability.

ST xylenediamine nylon intercalation layered compd; onium ion intercalation **bentonite clay**

IT **Clays**, properties

RL: PEP (Physical, engineering or chemical process); PRP (Properties);  
 PROC (Process)  
 (bentonitic; intercalates formed with MXD6 nylon intercalants and composites)

IT **Nanocomposites**

(intercalates formed with MXD6 nylon intercalants and composites)

IT Intercalated phyllosilicates

Intercalation compounds

RL: IMF (Industrial manufacture); PRP (Properties); PREP (Preparation)  
 (intercalates formed with MXD6 nylon intercalants and composites)

IT **Rubber**, uses

RL: POF (**Polymer in formulation**); TEM (Technical or engineered material use); USES (Uses)

(intercalates formed with MXD6 nylon intercalants and composites)

IT **Clays**, properties

RL: PEP (Physical, engineering or chemical process); PRP (Properties);  
 PROC (Process)

(smectitic; intercalates formed with MXD6 nylon intercalants and

composites)

IT Onium compounds

Phosphonium compounds

**Quaternary** ammonium compounds, uses

Sulfonium compounds

RL: MOA (Modifier or additive use); USES (Uses)  
(spacing/coupling agent; intercalates formed with MXD6 nylon  
intercalants and composites)

IT Plastics, uses

RL: POF (**Polymer in formulation**); TEM (Technical or engineered  
material use); USES (Uses)  
(thermoplastics, composites; intercalates formed with MXD6 nylon  
intercalants and composites)

IT Plastics, uses

RL: POF (**Polymer in formulation**); TEM (Technical or engineered  
material use); USES (Uses)  
(thermosetting, composites; intercalates formed with MXD6 nylon  
intercalants and composites)

IT 25718-70-1, Adipic acid-m-xylenediamine copolymer 25805-74-7, MXD6

RL: MOA (Modifier or additive use); USES (Uses)  
(intercalants; intercalates formed with MXD6 nylon intercalants and  
composites)

IT 1838-08-0, Octadecylammonium chloride 1875-92-9D, Dimethylbenzylammonium  
chloride, alkyl chloride **quaternary** ammonium salt

RL: MOA (Modifier or additive use); USES (Uses)  
(spacing/coupling agent; intercalates formed with MXD6 nylon  
intercalants and composites)

RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Allied Signal Inc; WO 9304117 A 1993 HCPLUS

(2) Wolff Walsrode Ag; EP 0818508 A 1998 HCPLUS

L75 ANSWER 45 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 2000:157728 HCPLUS

DN 132:181901

ED Entered STN: 09 Mar 2000

TI **Nanocomposite** materials formed from inorganic layered materials  
dispersed in a polymer matrix

IN Elspass, Chester W.; Peiffer, Dennis George

PA Exxon Research and Engineering Co., USA

SO U.S., 5 pp., Cont.-in-part of U.S. Ser. No. 804,021, abandoned.

CODEN: USXXAM

DT Patent

LA English

IC ICM C08K003-34

ICS C08K003-10

NCL 524445000

CC 39-13 (Synthetic Elastomers and Natural **Rubber**)

Section cross-reference(s): 37

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6034164	A	20000307	US 1998-187872	19981106

PRAI US 1997-804021 19970221

OS MARPAT 132:181901

AB Composition having sufficiently low air permeability to be useful as a tire  
inner liner, among other things, is prepared by blending a layered material  
with a metal processible nonionic 1st polymer having a number-average  
mol.-weight

≥50,000 g/mol and a 2nd nonionic polymer compatible with the 1st polymer and having a number-average mol.-weight less than that of the 1st polymer.

Thus, a **nanocomposite** was prepared by blending a dialkylammonium-modified **montmorillonite** 5, a brominated isobutylene-p-methylstyrene **rubber** (I; number-average mol.-weight 70000 g/mol) 2.75, I (number-average mol.-weight 300000 g/mol) 47.3 g.

ST **rubber** coated alkylammonium modified **montmorillonite**; tire inner liner coated **montmorillonite**; isobutylene methylstyrene **rubber** coating **montmorillonite**

IT Synthetic **rubber**, properties

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(isobutylene-methylstyrene, brominated; **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT Butadiene **rubber**, properties

Butyl **rubber**, properties

Isoprene **rubber**, properties

Natural **rubber**, properties

**Styrene-butadiene rubber**, properties

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(**nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT Phosphonium compounds

Pyridinium compounds

**Quaternary ammonium compounds**, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(**rubber**-coated; **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT 9003-17-2

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(butadiene **rubber**, **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT 9010-85-9

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(butyl **rubber**, **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT 1318-93-0, **Montmorillonite**, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(dialkylammonium-modified; **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT 9003-31-0

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(isoprene **rubber**, **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT 61128-14-1D, Isobutylene-p-methylstyrene copolymer, brominated

61128-14-1D, Isobutylene-p-methylstyrene copolymer, p-halogenated

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(**rubber**; **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT 9003-55-8

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM

(Technical or engineered material use); PROC (Process); USES (Uses)  
**(styrene-butadiene rubber,**  
**nanocomposite** materials formed from inorg. layered materials  
dispersed in a polymer matrix)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Anon; WO 9304118 1993 HCAPLUS
- (2) Beall; US 5552469 1996 HCAPLUS
- (3) Beall; US 5578672 1996 HCAPLUS
- (4) Horii; US 5539015 1996 HCAPLUS
- (5) Kawasumi; US 4810734 1989 HCAPLUS
- (6) Kresge; US 5576372 1996
- (7) Kresge; US 5576373 1996
- (8) Kresge; US 5665183 1997
- (9) Usuki; US 4889885 1989 HCAPLUS

L75 ANSWER 46 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2000-543341 [49] WPIX

DNC C2000-161615

TI Organophilic foliated silicates, useful in molding, (**nano**) composite, lacquer, adhesive, casting resin, coating, flame retardant, thixotropic agent or reinforcement, are obtained by treating foliated silicate with melaminium salt.

DC A21 A25 A60 E13 E33 L02

IN FINTER, J; MUEHLHAUPT, R; ZILIG, C; MUELHAUPT, R; ZILG, C

PA (VANT-N) VANTICO AG

CYC 24

PI WO 2000044669 A1 20000803 (200049)\* GE 32 C01B033-44

RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE  
W: BR CN JP KR US

EP 1165438 A1 20020102 (200209) GE C01B033-44  
R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

BR 2000007830 A 20020115 (200214) C01B033-44

KR 2001101734 A 20011114 (200230) C01B033-021

CN 1339013 A 20020306 (200236) C01B033-44

JP 2002535233 W 20021022 (200301) 31 C01B033-44

ADT WO 2000044669 A1 WO 2000-EP480 20000122; EP 1165438 A1 EP 2000-903610  
20000122, WO 2000-EP480 20000122; BR 2000007830 A BR 2000-7830 20000122,  
WO 2000-EP480 20000122; KR 2001101734 A KR 2001-709434 20010726; CN  
1339013 A CN 2000-803230 20000122; JP 2002535233 W JP 2000-595932  
20000122, WO 2000-EP480 20000122

FDT EP 1165438 A1 Based on WO 2000044669; BR 2000007830 A Based on WO  
2000044669; JP 2002535233 W Based on WO 2000044669

PRAI CH 1999-160 19990128

IC ICM C01B033-021; C01B033-44

ICS C04B014-20; C08J005-00; C08K009-04;  
C08L021-00; C08L063-00; C08L075-04;  
C08L101-00

AB WO 200044669 A UPAB: 20001006

NOVELTY - Organophilic foliated silicates (I) are claimed, which are obtained by treating natural or synthetic foliated silicate(s) with salt(s) (II) of an optionally **quaternary**, cyclic melamine compound.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for (a) thermoplastic polymers, thermosetting polymer systems, polyurethanes and **rubbers** containing (I); (b) molding compositions and moldings in the form of composites, especially **nano**-composites, containing (I); (c) lacquers, adhesives, casting resins, coatings, flame retardants,

thixotropic agents and/or reinforcements containing (I); (d) the use of amidine compounds, comprising salts (IIA), (IIB) and (IIC) of melamine with 1, 2 or 3 **quaternized** amino groups, for the production of (I).

USE - Organophilic foliated silicates (I) are used in molding compositions and finished moldings and composites, preferably in the production of **nano**-composites; and the molding compositions are used in the production of lacquers, adhesives, casting resins, coatings, flame retardants, thixotropic agents and/or reinforcements (all claimed).

ADVANTAGE - Organophilic foliated silicates (I) combine good high temperature stability in processing with excellent dispersion and interfacial adhesion. Relatively large amounts can be added to thermosetting resins without increasing the viscosity, whilst (I) prepared from cyclic melamines with reactive groups can be grafted with the matrix. Melaminium ions derived from melamine or aminopropionic or 12-aminododecanoic acid give good layer separation combined with excellent adhesion to numerous polymers and fillers. Efficient **cation** exchange in the interlaminar spaces is obtained with melaminium salts with long and optionally substituted alkyl groups. In addition, (I) are not only excellent fillers for enhancing the mechanical properties of polymers but also act as flame retardants without the disadvantage of increased **water** absorption with melamine composites.

Dwg.0/0

FS CPI  
FA AB; DCN  
MC CPI: A08-F; A08-M06; A08-R06B; A12-A05; A12-B01; E07-D13B; E31-P02B;  
E31-P05B; L02-D15D

L75 ANSWER 47 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN  
AN 2000:182041 HCAPLUS  
DN 132:309555  
ED Entered STN: 22 Mar 2000  
TI Morphology, mechanical properties and mechanism of reinforcement of **rubber nanocomposites**  
AU Ganter, Markus; Reichert, Peter; Mulhaupt, Rolf; Gronski, Wolfram  
CS Freiburger Materialforschungszentrum FMF, Albert-Ludwigs-Universitat,  
Freiburg, D-79104, Germany  
SO Polymeric Materials Science and Engineering (2000), 82, 228-229  
CODEN: PMSEDG; ISSN: 0743-0515  
PB American Chemical Society  
DT Journal  
LA English  
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)  
AB Organophilic layered silicates show good dispersibility in **rubber** matrixes. They show slightly improved **rubber** reinforcement compared to precipitated silica, but the hysteresis is significantly higher than in silica-loaded compds. The reactive coupling agent, bis(triethoxysilylpropyl)tetrasulfan, Si69, has a similar effect for both filler types: lower stress at break and reduced hysteresis by inhibiting chain slip at filler surface. The mechanisms governing reinforcement are orientation of silicate layers with elongation/retraction and a chain slip process along silicate layers or filler aggregates.  
ST ammonium **montmorillonite** reinforcement butadiene **rubber**  
IT SBR morphol stress strain  
Stress-strain relationship  
(morphol., mech. properties and mechanism of reinforcement of **rubber nanocomposites**)

IT **Styrene-butadiene rubber, properties**  
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)  
(morphol., mech. properties and mechanism of reinforcement of  
**rubber nanocomposites**)

IT **Butadiene rubber, properties**  
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)  
(of cis-1,4-configuration; morphol., mech. properties and mechanism of  
reinforcement of **rubber nanocomposites**)

IT **1318-93-0, Montmorillonite, uses**  
RL: TEM (Technical or engineered material use); USES (Uses)  
(ammonium-modified; morphol., mech. properties and mechanism of  
reinforcement of **rubber nanocomposites**)

IT 9003-17-2  
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)  
(butadiene **rubber**, of cis-1,4-configuration; morphol., mech.  
properties and mechanism of reinforcement of **rubber  
nanocomposites**)

IT 107-64-2, Dimethyldistearylammomium chloride  
RL: NUU (Other use, unclassified); USES (Uses)  
(montmorillonite cation exchanged with; morphol.,  
mech. properties and mechanism of reinforcement of **rubber  
nanocomposites**)

IT 40372-72-3, Si69  
RL: MOA (Modifier or additive use); USES (Uses)  
(morphol., mech. properties and mechanism of reinforcement of  
**rubber nanocomposites**)

IT 9003-55-8  
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)  
(styrene-butadiene **rubber**, morphol.,  
mech. properties and mechanism of reinforcement of **rubber  
nanocomposites**)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Giannelis, E; Adv Mater 1996, V8, P29 HCPLUS
- (2) Kawasumi, M; Macromolecules 1997, V30, P6333 HCPLUS
- (3) Okada, A; ACS Symposium Series 1995
- (4) Reichert, P; Acta Polymerica 1998, V49, P116 HCPLUS
- (5) Zilg, C; Advanced Materials 1999, V11, P49 HCPLUS
- (6) Zilg, C; Kunststoffe 1998, V88, P1812 HCPLUS
- (7) Zilg, C; Macromol Chem & Phys 1999, V200, P661 HCPLUS

L75 ANSWER 48 OF 59 COMPENDEX COPYRIGHT 2004 EEI on STN

AN 2000(31):898 COMPENDEX

TI Polymer-layered silicate **nanocomposites**: Preparation, properties  
and uses of a new class of materials.AU Alexandre, Michael (Univ of Mons-Hainaut, Mons, Belgium); Dubois, Philippe  
SO Materials Science and Engineering: R: Reports v 28 n 1 2000.p 1-63  
CODEN: MIGIEA ISSN: 0927-796X

PY 2000

DT Journal

TC Bibliography; Experimental

LA English

AB This review aims at reporting on very recent developments in syntheses,  
properties and (future) applications of polymer-layered silicate  
**nanocomposites**. This new type of materials, based on smectite  
clays usually rendered hydrophobic through ionic exchange of the  
sodium interlayer cation with an onium cation, may be  
prepared via various synthetic routes comprising exfoliation adsorption,

in situ intercalative polymerization and melt intercalation. The whole range of polymer matrices is covered, i.e. thermoplastics, thermosets and **elastomers**. Two types of structure may be obtained, namely intercalated **nanocomposites** where the polymer chains are sandwiched in between silicate layers and exfoliated **nanocomposites** where the separated, individual silicate layers are more or less uniformly dispersed in the polymer matrix. This new family of materials exhibits enhanced properties at very low filler level, usually inferior to 5 weight%, such as increased Young's modulus and storage modulus, increase in thermal stability and gas barrier properties and good flame retardancy. (Author abstract) 115 Refs.

CC 482.2 Minerals; 933.1 Crystalline Solids; 815.2 Polymerization; 641.1 Thermodynamics; 802.3 Chemical Operations; 803 Chemical Agents

CT \*Silicates; **Nanostructured** materials; Polymerization; Adsorption; Flame retardants; Thermodynamic stability

ST Exfoliation

L75 ANSWER 49 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN DUPLICATE 8  
AN 1999-592912 [51] WPIX

DNC C1999-173308

TI Organoclay chemical composition useful as rheological additives or in production of **nanocomposites**.

DC A18 A28 A60 E19 G02 H07

IN KAIZERMAN, J; ROSS, M

PA (RHEO-N) RHEOX INC

CYC 29

PI EP 952187 A1 19991027 (199951)\* EN 16 C08K009-04 <--  
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT  
RO SE SI

CA 2255488 A1 19991022 (200013) EN C08K009-04 <--

JP 2000026655 A 20000125 (200016) 48 C08K009-04 <--

MX 9902870 A1 20000801 (200137) C08K003-34 <--

US 6380295 B1 20020430 (200235) C08K003-34 <--

US 2004087700 A1 20040506 (200430) C08K003-34 <--

ADT EP 952187 A1 EP 1999-300881 19990205; CA 2255488 A1 CA 1998-2255488  
19981208; JP 2000026655 A JP 1999-111711 19990420; MX 9902870 A1 MX  
1999-2870 19990325; US 6380295 B1 US 1998-64216 19980422; US 2004087700 A1  
Cont of US 1998-64216 19980422, US 2001-14852 20011214

FDT US 2004087700 A1 Cont of US 6380295

PRAI US 1998-64216 19980422; US 2001-14852 20011214

IC ICM **C08K003-34; C08K009-04**

ICS C01B033-44; **C08K005-17; C08L101-16; C09K003-00;**  
**C10M113-10**

AB EP 952187 A UPAB: 19991207

NOVELTY - Hybrid organoclay comprising ion-exchanged organic chemical/phyllosilicate **clay** intercalate provides a better dispersing composition without the need for energy-intensive isolation techniques. The intercalate is obtained by the intercalation and reaction of a smectite **clay**, a **quaternary** ammonium compound and a non-anionic organic material.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for

(a) a **nanocomposite** comprising a matrix of polymer, plastic or resin and the above organoclay; and

(b) a rheological additive for liquid organic systems comprising the above organoclay.

USE - For use in the production of **nanocomposites** with improved characteristics or as rheological additive in liquid organic systems e.g. paints and coatings.

Dwg.0/0

FS CPI  
 FA AB; DCN  
 MC CPI: A08-M06; E07-E01; E10-A22E; E10-A22G; E31-P02B; G02-A03; H07-G06

L75 ANSWER 50 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 1999:549317 HCPLUS

DN 131:171089

ED Entered STN: 31 Aug 1999

TI Organophilic phyllosilicates for filling polymeric materials

IN Zilg, Carsten; Mulhaupt, Rolf; Finter, Jurgen

PA Ciba Specialty Chemicals Holding Inc., Switz.

SO PCT Int. Appl., 59 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM C08K009-00

CC 37-6 (Plastics Manufacture and Processing)

Section cross-reference(s): 39

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9942518	A2	19990826	WO 1999-EP881	19990210
	WO 9942518	A3	19991007		
	W: BR, CN, JP, KR				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	BR 9908120	A	20001024	BR 1999-8120	19990210
	EP 1060211	A2	20001220	EP 1999-910216	19990210
	EP 1060211	B1	20030423		
	R: CH, DE, ES, FR, GB, IT, LI, NL				
	JP 2002504582	T2	20020212	JP 2000-532468	19990210
	ES 2195547	T3	20031201	ES 1999-910216	19990210
	US 6197849	B1	20010306	US 1999-248649	19990211

PRAI CH 1998-408 A 19980220

WO 1999-EP881 W 19990210

OS MARPAT 131:171089

AB Organophilic phyllosilicates are manufactured by treating a naturally occurring or synthetic phyllosilicate, or a mixture of such silicates, with a salt of a **quaternary** or other cyclic amidine compound, or with a mixture of such salts. These products in the exfoliated form are useful as fillers for thermoplastic polymers and thermosetting polymer systems, preferably epoxy resins, polyurethanes and **rubbers** in the manufacture of **nanocomposites**. A typical organophilic phyllosilicate was manufactured by reaction of 466.7 castor oil 4 h at 150° with 135.23 g ethylenediamine, mixing 154.6 g resulting ricinyl-4,5-dihydro-1H-imidazole with 48 mL HCl in 4 L **water**, and mixing 200 g Somasif ME100 (synthetic 3-layer silicate) with the resulting hot solution

ST organophilic phyllosilicate filler **nanocomposite** manuf; ricinylidihydroimidazole hydrochloride treated phyllosilicate filler;

**rubber nanocomposite** amidine salt treated

phyllosilicate; polyurethane **nanocomposite** amidine salt treated

phyllosilicate; epoxy resin **nanocomposite** amidine salt treated

phyllosilicate

IT Onium compounds

RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(4,5-dihydro-1-methyl-2-nortallow alkyl-1-(2-tallow amidoethyl)

imidazolium, Me sulfates, Rewoquat W75; amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

- IT Fillers  
(amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)
- IT **Bentonite**, uses  
Phyllosilicate minerals  
**Quaternary ammonium compounds**, uses  
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)
- IT Polyurethanes, uses  
**Rubber**, uses  
RL: POF (**Polymer in formulation**); USES (Uses)  
(amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)
- IT Epoxy resins, properties  
RL: POF (**Polymer in formulation**); PRP (Properties); USES (Uses)  
(amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)
- IT Soybean oil  
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process); USES (Uses)  
(epoxidized, anhydride-cured; amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)
- IT Silicates, uses  
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(phyllo-; amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)
- IT Castor oil  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(salt precursor; amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)
- IT 29658-97-7DP, Dodecenylsuccinic acid, derivs., reaction products with epoxy resins 33435-76-6DP, reaction products with dodecenylsuccinates 62449-33-6P 173939-82-7P, Servamine KOO 330 173939-83-8P, Servamine KOO 360 238761-44-9P 239091-86-2P  
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process); USES (Uses)  
(amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)
- IT 1318-00-9, Vermiculite **1318-93-0**, Montmorillonite, uses 1319-41-1, Saponite **12172-85-9**, Beidellite **12173-47-6**, Hectorite 12174-06-0, Nontronite 12244-16-5, Halloysite 12417-86-6, Stevensite **12424-32-7**, **Sauconite** 65559-84-4D, 3-(2-Aminoethyl)-4,5-dihydro-1-methylimidazolinium methyl sulfate, tallow derivs. 182636-27-7, Somasif ME 100  
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)
- IT 33435-76-6

RL: POF (**Polymer in formulation**); PRP (Properties); USES (Uses)  
(amidine salt-treated phyllosilicates for filling polymeric materials  
in manufacture of **nanocomposites**)

IT 238761-43-8P

RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT  
(Reactant or reagent)  
(salt precursor; amidine salt-treated phyllosilicates for filling  
polymeric materials in manufacture of **nanocomposites**)

IT 107-15-3, 1,2-Ethanediamine, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)  
(salt precursor; amidine salt-treated phyllosilicates for filling  
polymeric materials in manufacture of **nanocomposites**)

L75 ANSWER 51 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN

AN 1998:721814 HCAPLUS

DN 129:317113

ED Entered STN: 13 Nov 1998

TI Polymer and **rubber nanocomposites** based upon layered  
silicates

AU Zilg, Carsten; Reichert, Peter; Dietsche, Frank; Engelhardt, Thomas;  
Muelhaupt, Rolf

CS Materialforschungszentrum Freiburg, Freiburg/Br., Germany  
SO Kunststoffe (1998), 88(10), 1812-1813,1916,1818,1820

CODEN: KUNSAV; ISSN: 0023-5563

PB Carl Hanser Verlag

DT Journal; General Review

LA German

CC 38-0 (Plastics Fabrication and Uses)

Section cross-reference(s): 39

AB A review with 15 refs. on the preparation and material properties of polymer  
and **rubber** composites with organophilic layered silicates. The  
layered silicates, e.g. **montmorillonite**, were modified by a  
treatment with **quaternary** alkylammonium ions and then  
incorporated into plastics or **rubber** matrixes. The strength,  
firmness, stiffness, and thermal plasticity of these  
**nanocomposites** was increased and their optical and elec.  
properties were improved. Possible applications were discussed due to  
their barrier effect against gas and liquid permeation and their flame  
retardancy.

ST review polymer **rubber nanocomposite** layered silicate

IT Silicates, uses

RL: MOA (Modifier or additive use); USES (Uses)

(layered, surface-modified; preparation and properties of polymer and  
**rubber** composites with organophilic layered silicates)

IT **Rubber**, uses

RL: POF (**Polymer in formulation**); PRP (Properties); USES (Uses)

(preparation and properties of polymer and **rubber** composites with  
organophilic layered silicates)

IT Reinforced plastics

RL: PRP (Properties)

(preparation and properties of polymer and **rubber** composites with  
organophilic layered silicates)

L75 ANSWER 52 OF 59 RAPRA COPYRIGHT 2004 RAPRA on STN

AN R:726252 RAPRA FS Rapra Abstracts

TI HYBRID ORGANIC-INORGANIC MATERIALS: STRUCTURAL ASPECTS AND PROPERTIES.

AU Mascia L (Loughborough, University)

SO Chimica e l'industria 80, No.5, June 1998, p.623-8

PY 1998  
DT Journal  
LA Italian  
AB Processes for the preparation of organic-inorganic composites (ceramers or **nanocomposites**) combining polymeric and silica phases are described, with particular reference to studies carried out by Loughborough University. An examination is also made of significant properties of these materials, including thermal expansion, elastic modulus, thermooxidative stability, porosity and **water** vapour permeability. 24 refs.  
CC 51SS; 627; 932; 93511; 9511; 964; 9.12.2  
SC \*OK; MB; UE; UG; UH; UM  
CT ACETYLENE GROUP; ACRYLATE POLYMER; ACRYLIC ESTER POLYMER; ADDITIVE; AGGREGATE; ALKOXYSLANE GROUP; AMIDE POLYMER; APPLICATION; CAPROLACTONE POLYMER; CARBONYL GROUP; CERAMER; CERAMIC; CERAMIC COMPOSITE; CHEMICAL STRUCTURE; COATING; COMPOSITE; CONDENSATION REACTION; CONTROLLED-RELEASE; COUPLING AGENT; CURING; CURING AGENT; DATA; DIMETHYL ACRYLAMIDE POLYMER; DIMETHYL SILOXANE POLYMER; ELASTIC MODULUS; **ELASTOMER**; ENGINEERING APPLICATION; ENGINEERING PLASTIC; EPOXIDE GROUP; EPOXIDE RESIN; EPOXY RESIN; ETHERKETONE POLYMER; EVAPORATION; EXFOLIATION; EXPANSION; FUNCTIONAL GROUP; FUNCTIONALISATION; FUNCTIONALIZATION; GEL; GELATION; GELLING; GELS; GLASS TRANSITION TEMPERATURE; GRAPH; HIGH MODULUS; HYBRID COMPOSITE; HYDROXYPROPYL CELLULOSE; IMIDE POLYMER; INSTITUTION; INTERLAMINAR PROPERTIES; INTERLAMINAR SHEAR; INTERLAMINAR SHEAR STRENGTH; MECHANICAL PROPERTIES; MERCAPTAN GROUP; MOLEC.WT.; MOLECULAR AGGREGATION; MOLECULAR MASS; MOLECULAR STRUCTURE; MOLECULAR WEIGHT; MORPHOLOGICAL PROPERTIES; MORPHOLOGY; **NANOCOMPOSITE**; **NANOSTRUCTURE**; NYLON; NYLON-6; OLIGOMER; ORGANIC-INORGANIC COMPOSITE; **PARTICLE GROWTH**; PDMS; PEK; PERFLUOROPOLYETHER; PHOSPHAZENE POLYMER; PLASTIC; POLYACRYLATE; POLYAMIDE; POLYAMIDE-6; POLYCAPROLACTONE; POLYDIALKYLSILOXANE; POLYDIMETHYL ACRYLAMIDE; POLYDIMETHYL SILOXANE; POLYDIMETHYLSILOXANE; POLYEPOXIDE; POLYETHER KETONE; POLYETHYL OXAZOLINE; POLYIMIDE; POLYPHENYLENE TEREPHTHALAMIDE; POLYPHOSPHAZENE; POLYSILOXANE; POLYSULFONE; POLYSULPHONE; POLYTETRAHYDROFURAN; POLYTETRAMETHYLENE ETHER; POLYTETRAMETHYLENE OXIDE; POLYVINYL ACETATE; POLYVINYL PYRROLIDONE; POLYVINYL PYRROLIDONE; POROSITY; PRECURSOR; PROPERTIES; PVAC; **RUBBER**; SILANOL GROUP; SILICONE POLYMER; SILOXANE POLYMER; SOL; SOL-GEL REACTION; SOLUBILITY; SOLUTION; SOLVENT EVAPORATION; SULPHONE POLYMER; TECHNICAL; TELECHELIC; TERMINATION; TG; THERMAL EXPANSION; THERMAL PROPERTIES; THERMOOXIDATIVE STABILITY; THERMOPLASTIC; THERMOSET; ULTRAVIOLET CURING; UV CURING; VAPOUR PERMEABILITY; **WATER ABSORPTION**; **WATER VAPOR** **PERMEABILITY**; **WATER VAPOUR PERMEABILITY**; XEROGEL; YOUNG'S MODULUS  
NPT ISOIMIDE; METAL ALKOXIDE; **METAL CATION**; MONTMORILLONITE ; ORMOSIL; SILANE; SILICA; SILICON DIOXIDE; TETRAETHOXYSILANE; TITANIUM; TITANIUM ISOPROPOXIDE; TITANIUM OXIDE; TRIALKOXYSILANE; TRIMETHOXYSILANE  
SHR COMPOSITES, plastics, **rubbers**, fillers in, elastic properties, degradation, permeability, porosity, thermal properties; DEGRADATION, thermooxidative, plastics, **rubbers**, composites; POROSITY, plastics, **rubbers**, composites; FILLERS IN, plastics, **rubbers**, composites; PERMEABILITY, **water** vapour, plastics, **rubbers**, composites; ELASTIC PROPERTIES, plastics, **rubbers**, composites; THERMAL PROPERTIES, expansion, plastics, **rubbers**, composites; FILLERS OF, silica  
GT EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

AN 1996-302025 JAPIO  
TI PRODUCTION OF **ELASTOMER** CONTAINING INORGANIC FILLER AND  
COMPOSITE RESIN MATERIAL  
IN NAKAZAWA HIROMOTO; FUJITA TAKETOSHI; HOSOKAWA TERUO; TAMURA TAKASHI; INOUE  
HIROFUMI; MOGI YOSHIHIRO  
PA NATL INST FOR RES IN INORG MATER  
SHOWA DENKO KK  
PI JP 08302025 A 19961119 Heisei  
AI JP 1995-108668 (JP07108668 Heisei) 19950502  
PRAI JP 1995-108668 19950502  
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1996  
IC ICM C08J003-20  
ICS C08J005-00  
ICI C08L021:00  
AB PURPOSE: To simply produce a high-rigidity **elastomer** containing  
an inorganic filler having high general-purpose properties due to its  
excellence in heat and impact resistances at a low cost by finely  
dispersing an inorganic filler at the level of the **nanometer**  
order in an **elastomer** according to a specific method.  
CONSTITUTION: (B) An organic **cation** (preferably a  
**quaternary** ammonium salt, etc., such as an n-alkyl ammonium salt)  
is initially brought into contact with (A) a layer compound (e.g.  
**montmorillonite** or tetrasilicic mica) and the resultant mixture is  
then swelled with (C) an organic solvent (preferably an aliphatic alcohol,  
etc., having a structure of an electron donor such as methanol). The  
swollen material is subsequently kneaded with (D) an **elastomer**  
(e.g. an ethylene-propylene copolymer) by using, e.g. a twin-screw  
extruder. The components (B) and (C) are preferably added in respective  
amounts of 1-10 equivalent based on the **cation** exchange capacity of  
the component (A). Furthermore, the component (C) is preferably vaporized  
to carry out the mixing during a period without destroying and separating  
an infinite swollen structure and the dispersion is preferably performed  
by shearing.  
COPYRIGHT: (C)1996, JPO

L75 ANSWER 54 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN  
AN 1995:817955 HCPLUS  
DN 123:259471  
ED Entered STN: 27 Sep 1995  
TI Synthesis and properties of new poly(dimethylsiloxane)  
**nanocomposites**  
AU Burnside, Shelly D.; Giannelis, Emmanuel P.  
CS Dep. of Materials Science and Engineering, Cornell Univ., Ithaca, NY,  
14853, USA  
SO Chemistry of Materials (1995), 7(9), 1597-600  
CODEN: CMATEX; ISSN: 0897-4756  
PB American Chemical Society  
DT Journal  
LA English  
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)  
AB Poly(dimethylsiloxane) **rubber**-silicate **nanocomposites**  
were prepared by melt processing. The preparation involved silicate  
delamination  
in the polymer matrix followed by crosslinking. Delamination was  
accomplished by fine-tuning organosilicate-polymer interactions. In  
addition, delamination was optimized by **water** addns. corresponding  
to about a monolayer coverage on the surface. The **nanocomposites**  
exhibit decreased solvent uptake and increased thermal stability. The

increased swelling resistance is attributed to strong reinforcement/matrix interactions and the large surface area attainable by delamination and dispersion of the silicate **particles** in the matrix.

- ST silicone **rubber** silicate **nanocomposite** prep;  
polydimethylsiloxane silicate **nanocomposite** prep property;  
delamination silicate silicone **rubber** matrix; reinforced  
silicone **rubber** delaminated silicate; swelling resistance  
reinforced polydimethylsiloxane **rubber**
- IT **Rubber**, silicone, properties  
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PROC (Process); USES (Uses)  
(di-Me, preparation and properties of silicone **rubber** reinforced  
with in situ-delaminated ion-exchanged **montmorillonite**)
- IT **Quaternary** ammonium compounds, properties  
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)  
(dimethylditallow alkyl, bromides, ion exchanged with  
**montmorillonite**; preparation and properties of silicone  
**rubber** reinforced with in situ-delaminated ion-exchanged  
**montmorillonite**)
- IT 1318-93-0D, **Montmorillonite**, ion exchanged with  
dimethylditallowammonium bromide, properties  
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)  
(delaminated; preparation and properties of silicone **rubber**  
reinforced with in situ-delaminated ion-exchanged  
**montmorillonite**)
- IT 169314-28-7, SO 4682  
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)  
(preparation and properties of silicone **rubber** reinforced with in  
situ-delaminated ion-exchanged **montmorillonite**)
- IT 9016-00-6, Dimethylsilanediol homopolymer, sru 31900-57-9,  
Dimethylsilanediol homopolymer  
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PROC (Process); USES (Uses)  
(**rubber**; preparation and properties of silicone **rubber**  
reinforced with in situ-delaminated ion-exchanged  
**montmorillonite**)

L75 ANSWER 55 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 9

AN 1995:337784 HCPLUS

DN 122:135770

ED Entered STN: 07 Feb 1995

TI Organophilic **rubber-montmorillonite**  
**nanocomposites**

AU Akelah, A.; Salah El-Deen, N.; Hiltner, A.; Baer, E.; Moet, A.

CS Chemistry Department, Tanta University, Tanta, Egypt

SO Materials Letters (1995), 22(1,2), 97-102

CODEN: MLETDJ; ISSN: 0167-577X

PB Elsevier

DT Journal

LA English

CC 39-12 (Synthetic Elastomers and Natural **Rubber**)

Section cross-reference(s): 38

AB Organophilic **rubber-montmorillonite** (MMT) intercalates  
were prepared by a cation-exchange process by the interaction  
between the Na<sup>+</sup> ions of **montmorillonite** and ammonium

cations of amine-terminated butadiene-acrylonitrile copolymers (nitrile rubber). The amount of the grafted rubber into montmorillonite layers as determined by the TGA anal. was found to be 0.6 g rubber/1 g rubber-MMT. The resulting rubber-MMT materials were identified by XRD, IR spectra and elemental anal. The SEM and TEM examns. showed that the clay layers were organized as nanosized clusters whose average size was 60 nm and basal spacings of 15.2 Å.

ST amine terminated nitrile rubber montmorillonite nanocomposite

IT Polymer morphology  
(of amine-terminated nitrile rubber-montmorillonite nanocomposites)

IT Rubber, nitrile, properties  
RL: PRP (Properties)  
(amine-terminated, characterization of amine-terminated nitrile rubber-montmorillonite nanocomposites)

IT 9003-18-3

IT RL: PRP (Properties)  
(rubber, amine-terminated, characterization of amine-terminated nitrile rubber-montmorillonite nanocomposites)

IT 1318-93-0, Montmorillonite, properties

IT RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)  
(sodium-exchanged; characterization of amine-terminated nitrile rubber-montmorillonite nanocomposites)

L75 ANSWER 56 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 1995:249609 HCPLUS

DN 122:108386

ED Entered STN: 17 Dec 1994

TI Morphological hierarchy of butadiene-acrylonitrile/montmorillonite nanocomposite

AU Akelah, A.; Salahuddin, N.; Hiltner, A.; Baer, E.; Moet, A.

CS Department Macromolecular Science, Case Western Reserve University, Cleveland, OH, 44106-7202, USA

SO Nanostructured Materials (1994), 4(8), 965-78

CODEN: NMAEE7; ISSN: 0965-9773

PB Elsevier

DT Journal

LA English

CC 39-12 (Synthetic Elastomers and Natural Rubber)

Section cross-reference(s): 38

AB A hierarchical model of the morphol. of amine-terminated butadiene-acrylonitrile rubber (ATBN)-montmorillonite (MMT) nanocomposite was established. The composite was prepared by ion exchange between the onium salt of the polymer (ATBN) and the interlamellar cation of the mineral (MMT). Composite containing 40% mineral was obtained. Chemical anal. indicated that all the ionic sites of the mineral have been occupied by polymer end groups. The d(001) spacing and the span between the internal lamellar surface were only expanded to about 14 Å and 5 Å, resp., suggesting horizontal packing of the polymer mols. TEM examination of microtome sections, prepared from compression molded samples, revealed that the lamellae, laminated with polymers assembled into multiplets of about 5 nm. On the other hand, the multiplets appear to assembly into mineral rich domains whose average size was 250 nm.

ST nitrile rubber montmorillonite nanocomposite

IT morphol  
IT Polymer morphology  
(hierarchical model of morphol. of amine-terminated nitrile  
**rubber-montmorillonite nanocomposite**)  
IT **Rubber**, nitrile, properties  
RL: PRP (Properties)  
(amine-terminated, hierarchical model of morphol. of amine-terminated  
nitrile **rubber-montmorillonite**  
**nanocomposite**)  
IT 1318-93-0, Sodium **montmorillonite**, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(hierarchical model of morphol. of amine-terminated nitrile  
**rubber-montmorillonite nanocomposite**)  
IT 9003-18-3  
RL: PRP (Properties)  
(**rubber**, amine-terminated, hierarchical model of morphol. of  
amine-terminated nitrile **rubber-montmorillonite**  
**nanocomposite**)

L75 ANSWER 57 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN  
AN 1995:695758 HCPLUS  
DN 123:289211  
ED Entered STN: 22 Jul 1995  
TI Preparation and characterization of butadiene-acrylonitrile/  
**montmorillonite nanocomposite**  
AU Akelah, A.; Salahuddin, N.; Hiltner, A.; Baer, E.; Moet, A.  
CS Dep. Macromolecular Sci., Case Western Reserve Univ., Cleveland, OH,  
44106-7202, USA  
SO Polymer Preprints (American Chemical Society, Division of Polymer  
Chemistry) (1994), 35(2), 739-40  
CODEN: ACPPAY; ISSN: 0032-3934  
PB American Chemical Society, Division of Polymer Chemistry  
DT Journal  
LA English  
CC 39-12 (Synthetic Elastomers and Natural **Rubber**)  
AB A model presenting the evolution of the hierarchical morphol. in Hycar  
ATBN (amine-terminated nitrile **rubber**) and  
**montmorillonite nanocomposites** is presented. In the  
intercalating medium, the mineral must have been disaggregated and swelled  
during the ion exchange reaction. Short range interactions must have been  
maintained on the lamellar scale as evidenced by their presence as  
multiplets and their reassembly into clusters. The inability of the  
mineral to reaggregate is attributed to the influence of ATBN through its  
dual functions, macromol. and **cationic**.  
ST nitrile **rubber montmorillonite nanocomposite**  
IT morphol; model evolution hierarchical morphol **nanocomposite**  
IT Polymer morphology  
(model describing evolution of hierarchical morphol. in  
amine-terminated nitrile **rubber-montmorillonite**  
**nanocomposites**)  
IT **Rubber**, nitrile, properties  
RL: POF (**Polymer in formulation**); PRP (Properties); USES (Uses)  
(amine-terminated, model describing evolution of hierarchical morphol.  
in amine-terminated nitrile **rubber-montmorillonite**  
**nanocomposites**)  
IT 1318-93-0, **Montmorillonite**, properties  
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)  
(model describing evolution of hierarchical morphol. in

amine-terminated nitrile **rubber-montmorillonite nanocomposites**)

IT 9003-18-3

RL: POF (Polymer in formulation); PRP (Properties); USES (Uses) (rubber, amine-terminated, model describing evolution of hierarchical morphol. in amine-terminated nitrile **rubber-montmorillonite nanocomposites**)

L75 ANSWER 58 OF 59 HCPLUS COPYRIGHT 2004 ACS on STN

AN 1995:92545 HCPLUS

DN 122:216310

ED Entered STN: 08 Nov 1994

TI Layered silicate/ATBN **nanocomposite**

AU Moet, A.; Akelah, A.; Salahuddin, N.; Hiltner, A.; Baer, E.

CS Department of Macromolecular Science, Case Western Reserve University, Cleveland, OH, 44106-7202, USA

SO Materials Research Society Symposium Proceedings (1994), 351(Molecularly Designed Ultrafine/Nanostructured Materials), 163-70

CODEN: MRSPDH; ISSN: 0272-9172

DT Journal

LA English

CC 39-15 (Synthetic Elastomers and Natural **Rubber**)

AB Composites of Hycar ATBN amine-terminated acrylonitrile-butadiene **rubber** and **montmorillonite** (MMT) were prepared by ion exchange between the onium salt of the polymer and the interlamellar **cation** of the mineral following two different preparation approaches. The first carried out the ion exchange in situ and used dioxane, a better solvent for the polymer, and the second administered the onium salt to MMT using DMSO. Elemental anal. and IR spectroscopy indicated that all the ionic sites of the mineral have been occupied by polymer end groups. The d (001) spacing and the span between the internal lamellar surface were only expanded to about 14 Å and 5 Å, resp., suggesting horizontal packing of the polymer mols. TEM of microtome sections prepared from compression molded composites revealed that the lamellae, laminated with polymers, assembled into multiplets of about 5 nm for both prepns. The multiplets clustered into mineral-rich domains whose average size was 250 nm for the DMSO preparation. Finer clusters (70 nm) were obtained by the first method. This three-fold decrease in the average domain size was attributed to the strong solvation power of dioxane in the binary solvent and to the locale of ion exchange.

ST **montmorillonite** nitrile **rubber** **nanocomposite**

IT Ion exchange

(amine-terminated acrylonitrile-butadiene **rubber**-sodium **montmorillonite** **nanocomposite** preparation by; morphol. hierarchy in relation to)

IT Polymer morphology

(of acrylonitrile-butadiene **rubber** **nanocomposites** with sodium **montmorillonite**; ion exchange preparation method in relation to)

IT **Rubber**, nitrile, preparation

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (amine-terminated, Hycar ATBN, **nanocomposites** with sodium **montmorillonite**; effect of ion exchange method on **nanostructure** evolution in preparation of)

IT 1318-93-0P, Sodium **montmorillonite**, preparation

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (**nanocomposites** with amine-terminated acrylonitrile-butadiene **rubber**; effect of ion exchange method on **nanostructure**)

evolution in preparation of)

IT 9003-18-3P

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(**rubber**, amine-terminated, Hycar ATBN, **nanocomposites**  
with sodium **montmorillonite**; effect of ion exchange method on  
**nanostructure** evolution in preparation of)

L75 ANSWER 59 OF 59 JAPIO (C) 2004 JPO on STN

AN 2003-192833 JAPIO

TI PREPARATION AND USE OF **NANOCOMPOSITE** MATERIAL OF  
**ELASTOMER** AND EXFOLIATED **CLAY** PLATELET FORMED IN SITU  
WITHIN **ELASTOMER** MATRIX AND PRODUCT INCLUDING TIRE HAVING AT  
LEAST ONE COMPONENT COMPRISING THE SAME

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IC ICM **C08L009-00**

ICS B60C001-00; **C08K003-34**

AB PROBLEM TO BE SOLVED: To provide preparation and use of  
**nanocomposite** materials comprising an **elastomer** matrix  
containing a dispersion therein of at least partially exfoliated platelets  
of an intercalated, multilayered, water-swellable **clay**.

SOLUTION: The exfoliated platelets are induced from an intercalated  
**clay** formed by an in situ **cation** exchange phenomenon  
between **cationically** exchangeable ions within galleries between  
layers of a multilayered **clay** and a preformed **latex** of  
**cationic** (positively charged) **elastomer** particles.

Furthermore, the positively charged **latex elastomer**  
particles can be produced by free radical emulsion polymerization using  
(A) a nonpolymerizable **cationic** surfactant and/or (B) a  
polymerizable **cationic** surfactant.

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